

MODERN Machine Shop

July, 1946

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MACHINES THAT
STAND UP UNDER
HIGHER SPEEDS AND
HEAVIER CUTS



NORMA-HOFFMANN
ROLLERS CORPORATION

STAMFORD, CONN.
FOUNDED 1911

Precision Ball, Roller and
Thrust Bearings

"NORMA-HOFFMANN"

PRECISION ROLLER BEARINGS

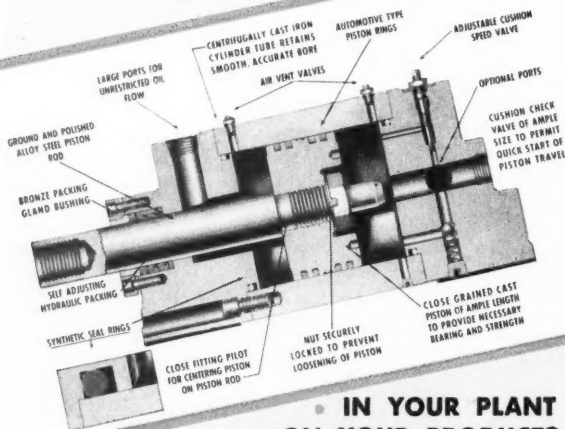
AFFORD MAXIMUM CAPACITY IN MINIMUM SPACE

DIMENSIONALLY INTERCHANGEABLE
WITH SINGLE-ROW BALL BEARINGS

FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh,
Cincinnati, Los Angeles, San Francisco, Portland, Ore., Seattle, Phoenix

STRAIGHT-LINE MOVEMENTS *Identical in*

LENGTH
SPEED
POWER



• IN YOUR PLANT • ON YOUR PRODUCTS

Where operator strength and skill cannot consistently produce the required accuracy and volume, OR where greater precision is necessary in straight-line mechanical movements . . . install the new Rotocast Hydraulic Cylinders.

There is no dependence on the human element or present machine efficiency—every cylinder stroke is exactly alike in length, speed and power. A smooth, full, controlled power flow with minimum friction and leakage results from the exclusive Logan combination of centrifugal cast iron cylinder barrels, precision bored and honed to a mirror finish, plus 4 automotive-type piston rings. "O" ring seals assure permanently leak-proof operation.

This means positive, uniform, efficient power for movements in any direction . . . in your own manufacturing or processing operations, and on the mechanical equipment you market . . . under simple control of the most convenient type.

**Ask for Engineering Help
... Write for Catalog 84**

7 Standard Mounting Types Available



Rabbeted



Foot



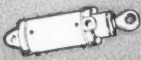
Center-Line



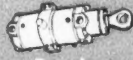
Blind
End
Flange



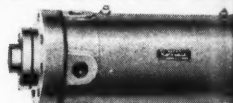
Rod
End
Flange



Clevis



Trunnion



• Dimensional accuracy bore smoothness retained life of cylinder by centrifugal cast iron barrels.

• No tie rods—end covers attached directly to cylinder barrels with socket-head cap screws.

• 7 different end cover types are completely interchangeable permit combination mounting.

• For oil or water service. Standard cylinders are suitable for use with treated water cylinders of special material furnished for use with treated water.

• 9 standard sizes from 2 1/2" bore; any stroke to 8" Cushioned at one or both ends if desired. For operating pressures to 1500 p.s.i.

Logan

Air and Hydraulic Equipment

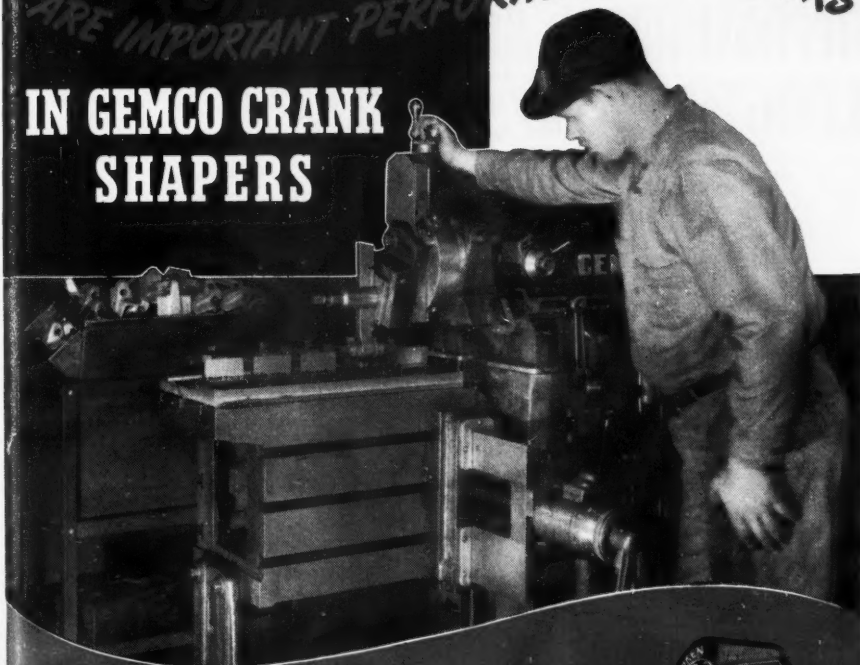
LOGANSPORT MACHINE CO., INC.

CHUCKS • CYLINDERS • VALVES • PRESSSES • SURE-FLOW CIRCUITS

TIMKEN BEARINGS

ARE IMPORTANT PERFORMANCE FACTORS

IN GEMCO CRANK SHAPERS

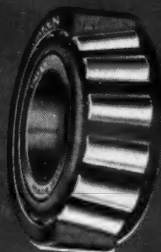


Timken Tapered Roller Bearings help Gemco Multi Purpose Crank Shapers attain and maintain the top-notch efficiency, speed and economy for which they were designed.

By mounting gear shafts on Timken Bearings, the manufacturer, General Engineering & Mfg. Co., St. Louis, has assured smoother, more accurate operation; increased endurance; reduced maintenance; and extended machine life.

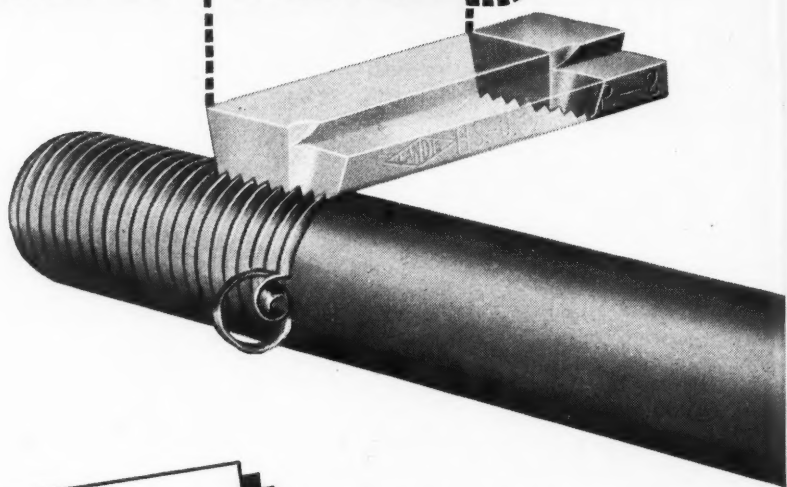
For Timken Bearings are more than anti-friction bearings; they also carry radial, thrust and combined loads; and hold moving parts in correct and constant alignment.

This versatility is a necessity in successfully meeting all bearing requirements in modern machine tools. That's why you should have Timken Bearings in your machines — but be sure the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton, Ohio.



TIMKEN
TAPERED ROLLER BEARINGS

WITH THE LANDIS CHASER APPROXIMATELY 80% OF THE CHASER'S LENGTH IS *USABLE*



12 Features of the LANDIS TANGENTIAL CHASER

- 1-Permanent throat permits close to shoulder threading throughout life of chasers
- 2-Rake angle range covers all machineable materials
- 3-Free cutting condition permits maximum cutting speeds
- 4-Simple grinding operation renews entire cutting edge and leading feature
- 5-Line contact with work lessens friction and minimizes thread distortion
- 6-Leading feature insures thread of accurate lead
- 7-Lateral absorption of cutting strain reduces vibration and chaser breakage
- 8-Right and lefthand threading feature reduces chaser equipment
- 9-Standard chasers thread all diameters with proper chaser holders
- 10-Interchangeability of chasers lowers operating cost
- 11-Chaser length provides exceptionally long life and low tool cost
- 12-Permanent throat gives equal distribution of cut

CHASER LENGTH PROVIDES EXCEPTIONALLY LONG LIFE AND LOW TOOL COST

Since the design of the Landis Chaser makes it possible to regrind approximately 80% of its length, with the cutting edge renewed at each regrinding, it has an exceptionally long life and thereby reduces chaser cost to a minimum. Conservatively estimated, the life of the Landis Chaser is from ten to twenty times that of the hobbed type die.

The Finest Thread Cutting Tool in Industry

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

How do you tell Age?

Heald engineers can show where outdated machines are costing you money

The age of a machine tool is measured by its capacity to produce—to actually *earn* money—not by years of service. That's why, with today's rising production costs, so many war-time machines are old beyond their years . . . outmoded by new ideas, new methods, new demands.

Regardless of design or condition, the *min-ute* your machine can be replaced by one that does the same job better—with greater output, to closer tolerances—you've got an obsolescent machine on your hands. And obsolescence means higher production costs.

Heald's staff of 200 engineers will show you how obsolescent equipment can be profitably replaced in every instance . . . by using the most efficient machining methods, either precision grinding or borizing, suited to your particular job. Whether you use one machine or a hundred, Heald engineers can help you to gain a better competitive position by improving your production and cutting your costs. For further information, write: THE HEALD MACHINE COMPANY, Worcester 6, Mass.

HEALD

means more precision
... less cost

WITH A HORSE . . .
you count teeth

WITH A TREE . . .
you count rings

BUT WITH A MACHINE . . .

COUNT COSTS!

INTERNAL AND SURFACE GRINDING MACHINES • BORE-MATIC PRECISION FINISHING MACHINES

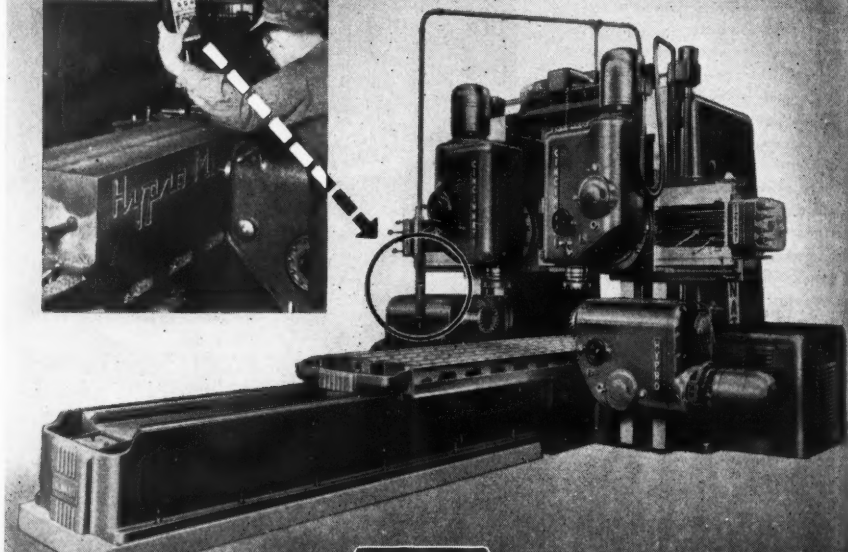
NOW COMPLETE FINGER-TIP CONTROL
FROM PENDANT STATION...

Hypro-electronic

PLANER MILLER DRIVE



Photo on left shows operator milling the words Hypro Miller in cast-iron block — an unusual demonstration of the versatility and absolute control of any head or table from pendant station exclusively.



THE CINCINNATI HYPRO PLANER COMPANY

PLANERS · BORING MILLS · PLANER TYPE MILLERS
CINCINNATI, OHIO

JUDGE A SPEED REDUCER BY EAR?

Your ears can tell you plenty about a speed reducer because there is no normal reason why a modern speed reducer should be noisy. Noise warns you that power transmission is not

smooth . . . that wear-causing friction is present.

That's why the quiet operation of Farrel speed reducers is so important . . . so significant. The noise you don't hear provides the evidence of precision-generated, continuous tooth herringbone gears, transmitting power in a smooth, quiet, even flow.

The continuous tooth design means that a maximum number of teeth are always in mesh. Overlap or interlacing of teeth, together with gradual engagement, promote smooth operation. Oblique lines of contact and uniformly distributed load eliminate danger of noise resulting at some later date from uneven tooth wear.

Farrel speed reducers are available in a wide range of sizes and capacities. Write for descriptive catalog No. 438.

FB-326

FARREL-BIRMINGHAM COMPANY, Inc.

344 VULCAN ST., BUFFALO 7, N. Y.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte



Farrel-Birmingham

ABRASIVE No. 3B

AUTOMATIC SURFACE GRINDER

A TOP PERFORMER ON THE PRODUCTION LINE AND IN THE TOOL ROOM

PRECISION PLUS

Vertical feed dial graduated to .0001" for extreme accuracy.

CUSHIONED TRAVEL

Hydraulic shock absorber and friction safety gear, cushion shock of table reversal.

ONE PIECE BED

1540 lb. casting eliminates vibration.

SUPER-PRECISION SPINDLE

Cartridge type—tapered bronze adjustable front bearings; super-precision ball bearings at rear. Alloy steel—ground and lapped.

GRIT CAN'T GET IN

Carefully engineered dust guards keep grit from scraped ways.

Write for detailed
Bulletin on 3-B.

We are glad to furnish information regarding Abrasive machines on the Government Surplus Tool list . . . Just send us the serial number of the machine; we will endeavor to provide any attachments or repair parts you desire.

SPECIFICATIONS

WORK CAPACITY:

24" long
8" wide
12" high

SPINDLE:

2290 R.P.M. bronze box and ball bearing.

WHEEL SIZE:

Standard 10" wheel, 8" or 12" wheels on order.

DRIVE:

3 H. P. motor with magnetic starter.

TABLE SIZE OVERALL:

59" x 10½"

NET WEIGHT:

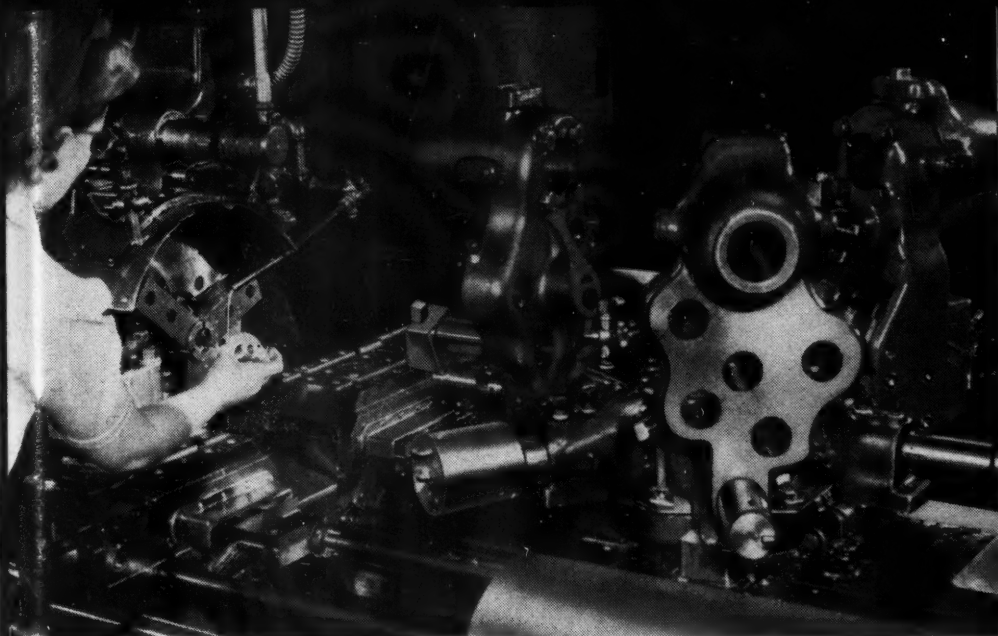
2670 lbs.

ABRASIVE

ACCURACY BOOSTS PRODUCTION



ABRASIVE MACHINE TOOL COMPANY EAST PROVIDENCE 14, RHODE ISLAND



Production Multiplied by Four with the **FASTERMATIC**

Where you have a part like this, requiring as many as six operations in one chucking, you have an ideal job for the Fastermatic.

Here, for example, the machining of gear blanks calls for a series of rough and finish turning, facing, and boring operations which formerly required eight minutes per part. With the Fastermatic, all these cuts are handled with the advantage of a completely automatic machining cycle. Time was reduced to only two minutes per part—a saving of 75%. And costs were reduced by 14 cents per piece.

The ability to handle a large number of operations in one chucking and require but little of the operator beyond loading and unloading the work, makes the Fastermatic a most profitable investment in low-cost production. Write for literature.



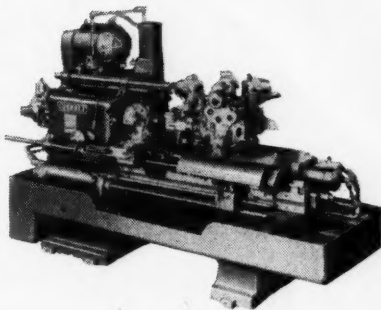
GISHOLT MACHINE COMPANY

1219 East Washington Ave. • Madison 3, Wisconsin

Look Ahead . . . Keep Ahead . . . with Gisholt



On these gear blanks, six operations are completed in 105 seconds, actual cutting time. Floor-to-floor time is 125 seconds.



The Fastermatic is a universal automatic turret lathe for both high and low production machining. It is equipped with a hydraulic feed system, automatically controlled by standard feed cams.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

A TREATISE ON

MILLING AND

MILLING MACHINES

Section One

MILLING MACHINES

•
ACCESSORIES

•
MILLING CUTTERS

•
CUTTING MATERIALS

•
CUTTER SHARPENING

THE CINCINNATI MILLING MACHINE CO. • CINCINNATI 9, OHIO, U. S. A.

Price \$100
Prepaid

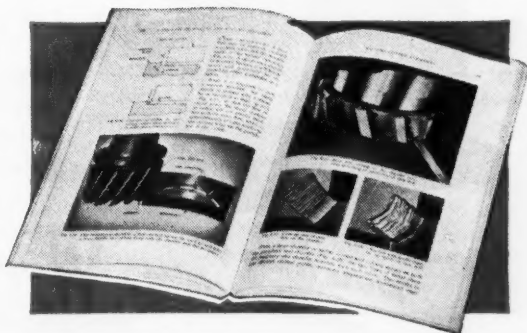
Size of the Treatise is
6 inches by 9 inches.

A New Book

ON MILLING MACHINES AND MODERN MILLING PROCEDURE

● This new book is cram full of information for those who want to keep abreast of recent developments in metal cutting by the process of milling. ¶ "Treatise on Milling and Milling Machines," Section I of a series, is devoted largely to standard milling machines, accessories and cutters. It contains 178 pages of useful data together with 176 photographs and drawings, and many tables and mathematical formulas to clarify the text and to help solve cutter problems. ¶ This new book may be used profitably by your shop supervisors . . . milling machine foremen, setup men, cutter sharpening foremen . . . and by time-study and methods engineers, tool designers, students and apprentices. Prepared by the engineers of The Cincinnati Milling Machine Co. who are backed by sixty years of milling know-how, it's devoid of advertising and written in simple, understandable language. Write for a copy of Section I today! The cost is only \$1 — postpaid anywhere. Section II of "Treatise on Milling and Milling Machines" will be published later.

Typical pages of Section I of "Treatise on Milling and Milling Machines." This book contains definitions of milling machines and their accessories, and detailed data on cutters, cutter materials and cutter sharpening practice.



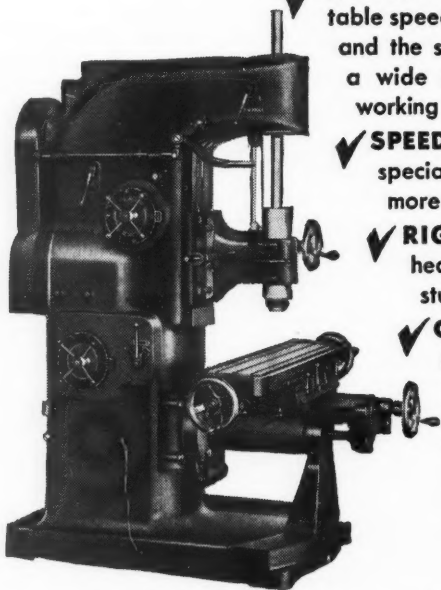
THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES



GAIN MANY ADVANTAGES WITH A KNIGHT MILLER!



- ✓ **FLEXIBILITY** ... Knight's tilting, swiveling table eliminates costly jigs and fixtures for holding special jobs in unusual or difficult positions.
- ✓ **CAPACITY** ... Sixteen changes of spindle and table speeds, four vertical spindle speed changes, and the swiveling table provide for the use of a wide range of cutter sizes and increased working area.
- ✓ **SPEED** ... Fast settings, reduced setup time, no special setups, and quick locating, all mean more work in less time and with less effort.
- ✓ **RIGIDITY** ... The one-piece semi-steel, heavily reinforced column casting assures sturdiness.
- ✓ **OPERATING SIMPLICITY** — Easily manipulated, conveniently located controls offer fast, efficient operation.

Learn more about the advantages of increased output and reduced costs offered by Knight Millers.

*Write today for
complete catalog*



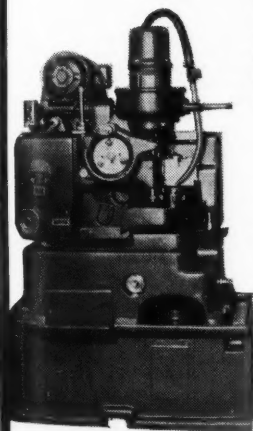
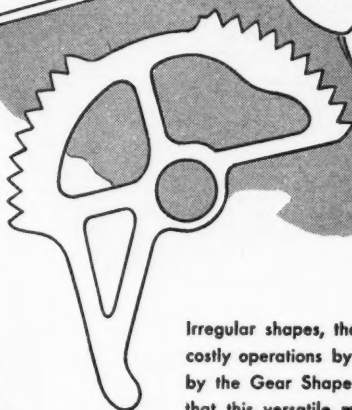
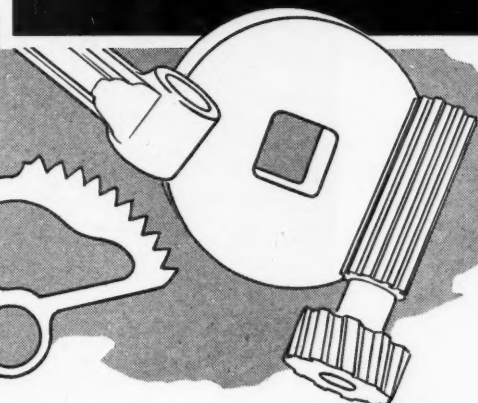
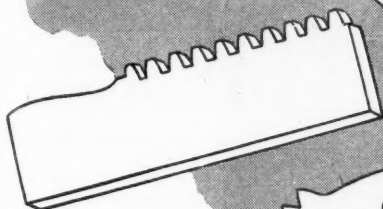
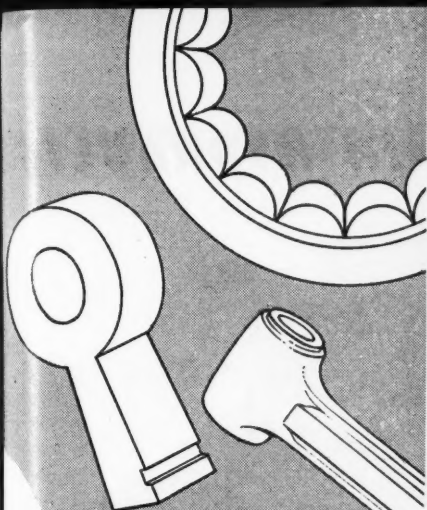
W.B. KNIGHT

MACHINERY COMPANY

MORE GOODS for MORE PEOPLE at LOWER COST

3920 WEST PINE BLVD. • ST. LOUIS 8, MISSOURI

Irregular shapes
become Regular Jobs
... on the Versatile
GEAR SHAPER



The 7-type Gear Shaper

Irregular shapes, that once meant a series of intricate, costly operations by other methods, are today machined by the Gear Shaper, with the same ease and economy that this versatile machine affords in the production of ordinary types of gears. The Gear Shaper accomplishes such work in a single work set-up, and requires but a quick change of cutters, work outfits or special attachments, before being ready for its next assignment. For further details, write for your complimentary copy of "The Art of Generating with a Reciprocating Tool."

THE FELLOWS GEAR SHAPER
COMPANY

78 River St., Springfield, Vermont — 640 West Town Office Bldg., Chicago 12, Illinois — 616 Fisher Bldg., Detroit 2, Mich.

New BUILT-IN HYDRAULIC



4" TYPE H PLAIN HYDRAULIC GRINDER

- AUTOMATIC GRINDING CYCLES
- WHEEL RESET MECHANISM
- GROUPED ELECTRIC CONTROLS
- AUTOMATIC WORK ROTATION AND COOLANT FLOW CONTROL
- AMPLE LEG ROOM



WHEEL RESET MECHANISM

for hydraulic straight infeed eliminates a very common cause of work spoilage. On the Landis Type H the wheel is automatically reset upon the conclusion of either grinding cycle, straight infeed or traverse.



ELECTRIC CONTROLS

are all conveniently grouped at the left-hand side of the bed. A master start button serves as a work jog. A master stop button provides extra safety. Conveniently located selector switches control coolant flow and work speed.



SMOOTH HYDRAULIC POWER

is provided by a hydraulic system powered by a direct connected motor driven oil pump. The machine base forms an oil reservoir, thus saving space and making possible more compact design of the unit.

LANDIS TOOL
Precision Grinders

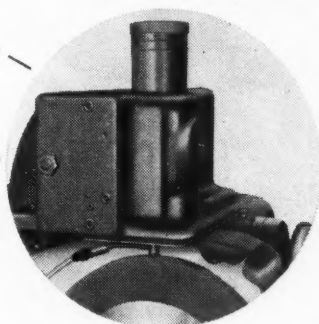
LANDIS TOOL COMPANY

LIC

WHEEL DRESSER...

*Saves Production Time
Assures Superior Finishes*

IN GRINDING SMALL PARTS



This view of the new Landis Built-In Hydraulic Wheel Dresser shows the diamond in dressing position, the method of directing coolant to the diamond, and the calibrated setting for fine grinding wheel face dressing.

For superior finishes and maximum production when grinding small parts, it's essential to have a free cutting face on the grinding wheel, and that the wheel remain concentric and parallel. However, the time necessary to break the setup and dress the grinding wheel can eat a big hole in your production schedule.

To speed grinding wheel dressing and maintain superior finishes, on the Landis 4" Type H Plain Hydraulic Grinder, a new built-in, hydraulic grinding wheel dresser can be supplied. It trues and dresses the wheel at one and the same time, without breaking the setup. All the operator does is set a dial and click a switch.

A cutting diamond traverses hydraulically across the face of the wheel and quickly sharpens it. In a matter of minutes the grinding wheel is "dressed" and true and the machine is ready for more work.

This wheel "dressing" unit is the latest addition to the long list of exclusive LANDIS TOOL features that make the LANDIS TOOL Type H so productive in turning out small parts up to 1½" with superior finishes. Other special LANDIS TOOL features of this grinding machine include, VARIABLE VOLTAGE HEADSTOCK DRIVE, MICROSPIRE WHEEL SPINDLE BEARINGS, ANNEALED CASTINGS AND DYNAMICALLY BALANCED PARTS. If you would like full details on this modern grinder, ask for your copy of Catalog A 44.

39

C POWER
powered by a
oil pump. The
air, thus saving
the compact de-



PANY

WAYNESBORO, PENNA.

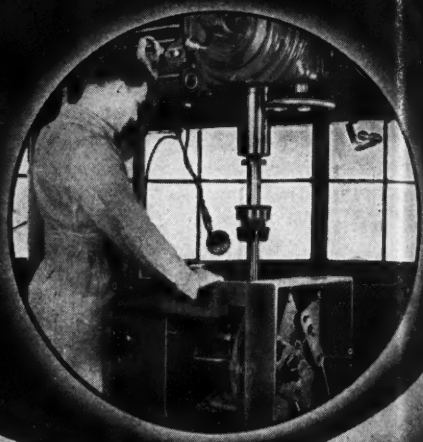


July, 1946

July, 1946

MODERN MACHINE SHOP 13

FOSDICK RADIAL



SWINGS INTO ACTION AT ...

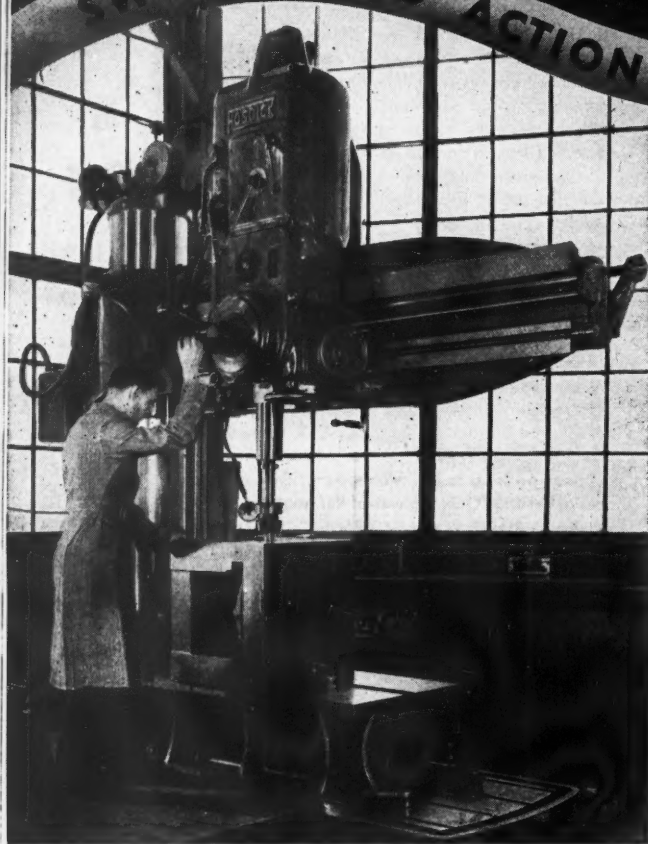
EX-CELL-O CORPORATION

The part being drilled is only one of many parts of various Ex-Cell-O machines that are drilled, tapped or bored on the sturdy, time and labor saving FOSDICK RADIAL DRILL.

A box jig holds the work while drilling, reaming or tapping various diameter holes from two or more sides.

Note the convenience and time-saving features of centralized control in the head. A wide range of feed and speed changes, as well as hand feed, are instantly available.

If **your** work can be handled on a Radial, it can be done on a Fostick. **Write for Bulletin MSR for full particulars.**



FOSDICK

MACHINE TOOL CO.
CINCINNATI 23, OHIO

Jarvis
DOUBLE-ACTION

LUBRO-BRUSH

● ELIMINATES HAND CLEANING AND LUBRICATION

You get fully automatic cleaning and lubrication of taps, reamers, drills and countersinks with the Jarvis Lubro-Brush. Easily installed on any standard drill or punch press, small lathe or hand miller.

● ASSURES GREATER TOOL LIFE

Field tests prove that the Jarvis Lubro-Brush adds from 20% to 80% to tap, drill and reamer life. Punches and dies also give longer service. So inexpensive that you can put one on every machine. Write today for fully descriptive Lubro-Brush bulletin.

The **CHARLES L. JARVIS CO.**
Middletown, Connecticut





Said an aged Caliph to his two sons: "My time has come, You each own a spirited steed, so I propose a race to Bagdad — and the son whose horse last enters the city shall inherit my estate." For weeks the two sons dawdled upon the road, each striving to go slower than the other. Then, one night at an inn, they sought the counsel of a wise man . . . and the next morning, at the crack of dawn, they leapt to the saddle and rode for Bagdad as fast as the horses could run.

What did the wise man tell them?

Moral: A little wisdom saves a lot of time in solving practical problems . . . and in the practical problems of metal turning, we consider ourselves to be wise.

Metal turning costs are a problem. The chances are that

turning accounts for 25 per cent or more of all machining time in your plant.

There are cases in our files of savings of hundreds of dollars a month in the manufacture of a single part by the use of Jones & Lamson machines. Our machines are designed specifically for the most efficient use of carbide tools which can remove metal 200 to 500 per cent faster. We have solved many tough cost problems. Solving them is our business.

Be skeptical of the production efficiency of all metal turning equipment in your plant.

Telephone or write for a Jones & Lamson engineer who will be glad to consult with you on all phases of your metal turning problems.



JONES & LAMSON

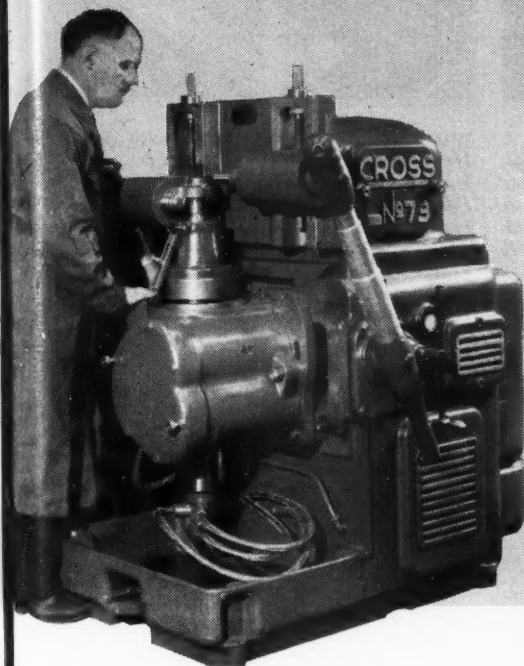
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Manufacturers of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies.

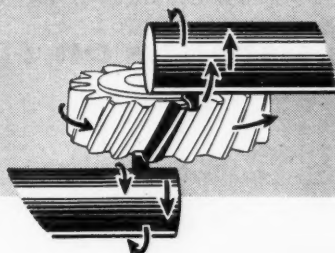
Many Features of the **CROSS No. 73**

mean *Faster, Automatic*

GEAR BURRING and CHAMFERING



- Automatic Cycle
- Easy to Operate
- Quick Set-ups
- 200 Automobile Transmission Gears Hourly
- Negligible Cutter Expense
- Accurate, Uniform Results



The Cross No. 73 is Industry's standard for small or large shops. In operation, two economical fly cutters rotate at high speed in synchronized relation with the work to chamfer and burr both ends of the gear teeth at the same time. Cutters are ground from ordinary tool bits. Foot-pedal control

clamps the work and automatic control stops the machine when each gear is finished.

The features of the entire line of Cross Gear Tooth Chamfering Machines are contained in the new Cross Catalog No. 106. The Cross Company, Dept. 73, Detroit 7, Michigan.

CROSS

ESTABLISHED
1898

SPECIAL MACHINES

TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

DETROIT 7, MICHIGAN

machining

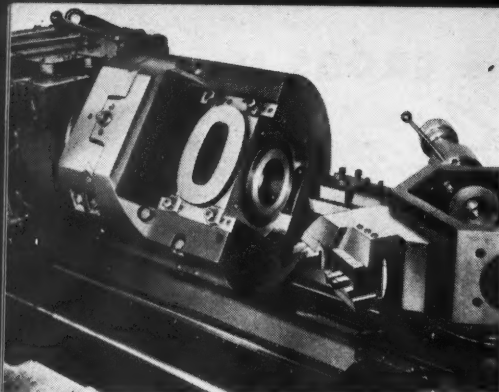
hundreds of
single part by
machines are
of carbide
cent faster.
involving them

of all metal

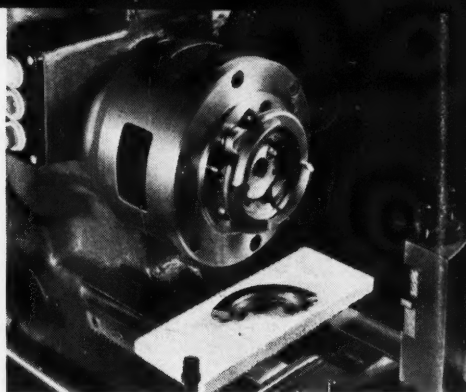
operator who will
your metal

Automatic Lathest
inesAutomatic
Automatic Opening
at Rolling Dies.

July, 1946



A 2450 LB. INDEXING CHUCK on a Warner & Swasey 4-A Turret Lathe handles several sizes of steel gate valve bodies. The 20° tapered valve seat inside the valve, and the three exterior right angle faces are finish machined; valve seats are inserted and finished—all in one operation.



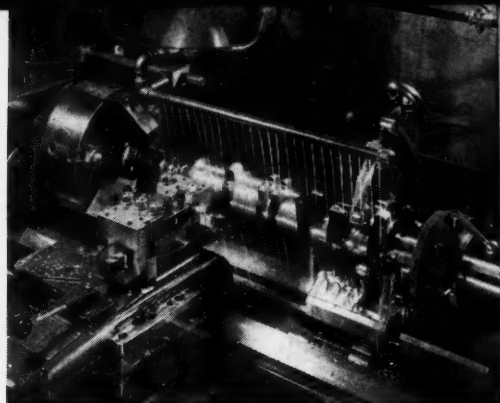
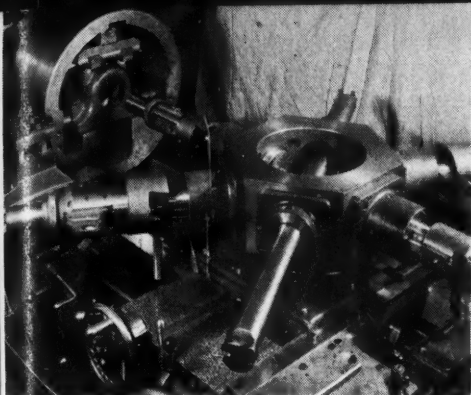
THIS SPECIAL HOLDING FIXTURE with Air Operated Holding Clamps on a Warner & Swasey No. 3 Universal Turret Lathe machines two typewriter type bar segments at once. Parts are faced, bored, recessed and chamfered on the inside surfaces, and grooved with ball form at bottom on the outside radius—all in one setup.

Warner & Swasey offers you assistance on special tooling problems



THE ENGINEERING DEPARTMENT at Warner & Swasey devoted to the design of special tooling for purchasers of Warner & Swasey Turret Lathes, Precision Tapping and Threading machines, and 5-Spindle Automatics. Here, production rates of tools are methodically estimated prior to manufacture. Special tools are usually tested on customers' samples at Warner & Swasey to make sure that estimates can be met.

TURRET LATHES, MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES



Operator
sey No. 3
typewriter
ced, bored
rfaces, and
the outside

SELF-ALIGNING SHAFT BRACKETS are spherically bored by these special boring bars on a Warner & Swasey 4-A Turret Lathe with Cross Sliding Hex Turret. Bars float axially in flanged tool holders, thrusting against pilot bushing in the spindle. The cutter blocks are rotated inside the bracket casting to machine an accurate sphere to close tolerances.

THE TURNING, BORING AND FACING OPERATIONS on this aircraft cylinder tube are done simultaneously on a Warner & Swasey 2-A Long Bed Turret Lathe. A steady rest supports the steel forging; another supports the external pilots of the drilling and boring bars. Note external coolant supply pipe; oil under pressure is also forced through the boring bars to flush out chips and cool the cutters.

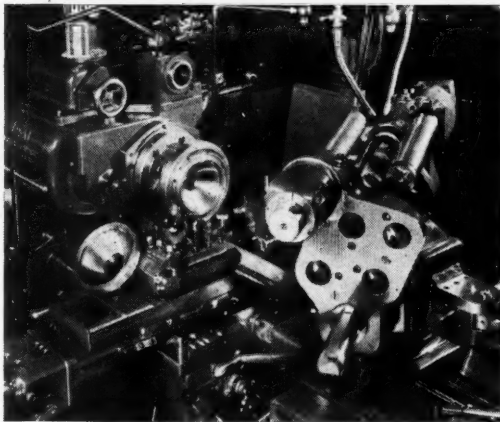
lems

THE big majority of turning jobs can be handled easily with Warner & Swasey Standard Bar and Chucking Tools.

Every so often however, the setup man or tool designer is confronted with a specific production job which may be produced faster at lower cost with special holding devices, contour cutters, boring bars, cutter holders, etc.

A separate engineering department at Warner & Swasey devotes itself exclusively to such tool design. It can draw upon the experiences of working with many other shops over the years.

Perhaps we can help you by studying your specific jobs and making definite recommendations. Write us . . . or contact our nearest Warner & Swasey branch office.

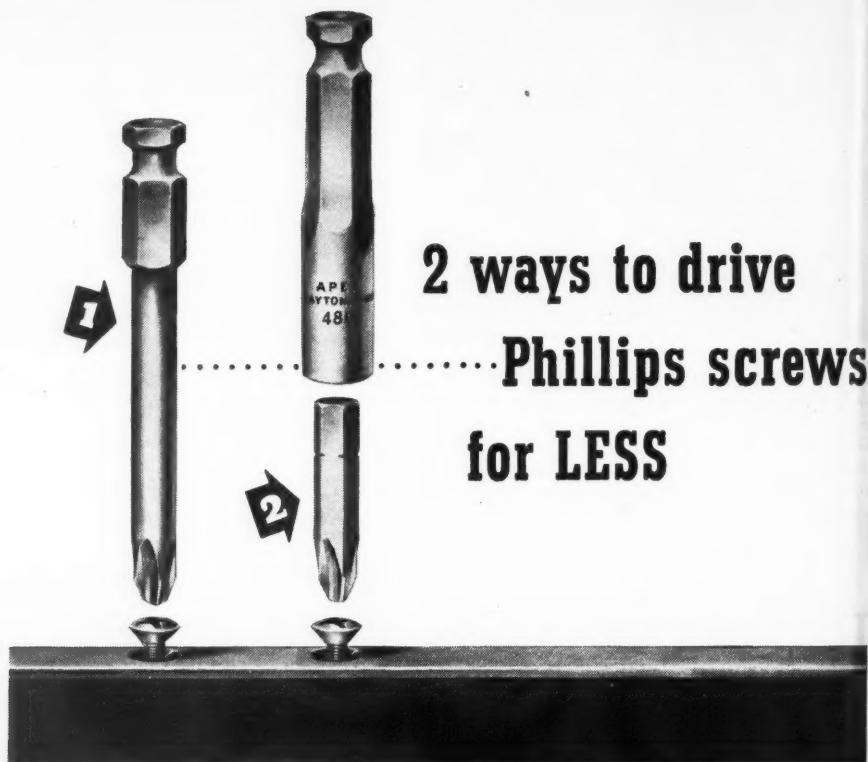


THE DIFFICULT CURVES of stainless steel molds for automobile head lamps are machined to a high finish on a volume basis on a Warner & Swasey 2-A Turret Lathe using special tools. Here is shown the setup for turning, facing, boring, forming and spherically facing the concave mold.

The complete line of standard Turret Lathe tools is described in the Warner & Swasey Tool Catalog. It is offered free to turret lathe users. If you do not have a copy write



ING MACHINE CAN MACHINE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY



2 ways to drive Phillips screws for LESS

... and they're both BEST!

1. Best for driving Phillips screws in close quarters, when you need a bit of minimum diameter. By returning worn bits to Apex for complete reconditioning, you can multiply service life many times — actually get eight lives per inch of bit. The cost: a fraction of the price of new bits.

Shanks: for all your electric, pneumatic, or spiral drivers.

2. Best for driving screws where space permits the slightly larger OD of the Apex exclusive bit holder, with the replaceable insert tip. Once you get holders for your drivers, it's a cinch to stock *four* sizes of tips to fit

practically all your bit holders and drive the full range of Phillips screw sizes. Tips float in holders, seat more easily in screw recesses, simplify bit inventory, give maximum service.

Write today for Catalog 15 on Apex standard power bits and Bulletin 102 on Apex insert type bits.

THE APEX MACHINE AND TOOL COMPANY, DAYTON, OHIO

APEX

screwdriver bits

Safety Friction Tapping Chucks • Quick Change and Positive Drive Drill Chucks • Vertical Float Tapping Chucks • Parallel Floating Tool Holders • Power Bits for Phillips, Slotted Head and Clutch Head Screw Drivers • Hand Drivers for Phillips and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal Joint Socket Wrenches

INTRODUCING ANOTHER OUTSTANDING
DEVELOPMENT IN AIR EQUIPMENT

Lehigh-MARTON PISTON TYPE *Air Valves*

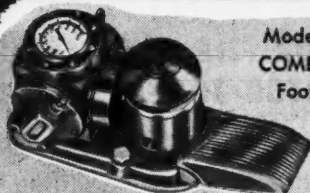


Model 2-MA8
Foot Operated
AUTOMATIC OR MANUAL
RETURN FOR
HOLDING OPERATIONS

- Easy to install. Low in cost.
- Exceptionally rugged construction.
- Adaptable to all shop uses.
- Available with or without the
MARTON 4-WAY
COMBINATION UNIT.

COMBINED FOR ADDED EFFICIENCY

The new Lehigh-MARTON Piston-Type
Air Valve with the popular and versatile
Lehigh-MARTON
4-WAY COMBINATION UNIT
(See Description Below)

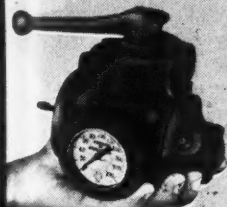


Model 2-MA6
COMBINATION
Foot Valve

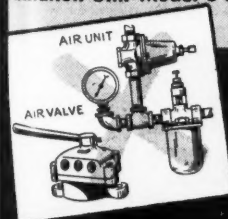
with Manual or Automatic
Return . . 3/8" or 1/2" Supply.



Model 2-MA9 — COMBINATION Hand Valve with
Manual or Automatic Return . . 3/8" or 1/2" Supply



Combination Unit Model 3-MA2



ONE UNIT DOES THE WORK OF FOUR 4-WAY COMBINATION PACKLESS VALVE

The finest unit on the market! Combines VALVE, GAUGE, REGULATOR, LUBRICATOR, STRAINER. Eliminates pipe fittings. Simplifies installation. Speeds production. Streamlines designing. For 2-3-and 6 way action. Packless valves are also available in Hand Models and in an exceptionally accurate Delayed Action Valve.

MARTON AIR VALVE DIVISION

WRITE FOR DATA SHEETS

Lehigh Foundries, Inc.

Plant & General Offices: EASTON, PENNA.

New England Representative

MARTON EQUIPMENT, INC., 195 Cabot Street, Boston, Mass.

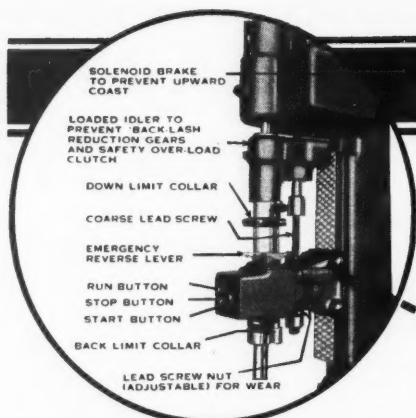
NEWS

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et Wrenches

July, 1946



Avey **FEATURE No. 3**

THE *Avey* TYPE MA-6 AVEY-MATIC POWER FEED HAND FEED AND REVERSING MOTOR TAPPING MACHINE

features

reversing motor, positive lead screw tapping — for accurate thread and tapping in soft material or thin sheets

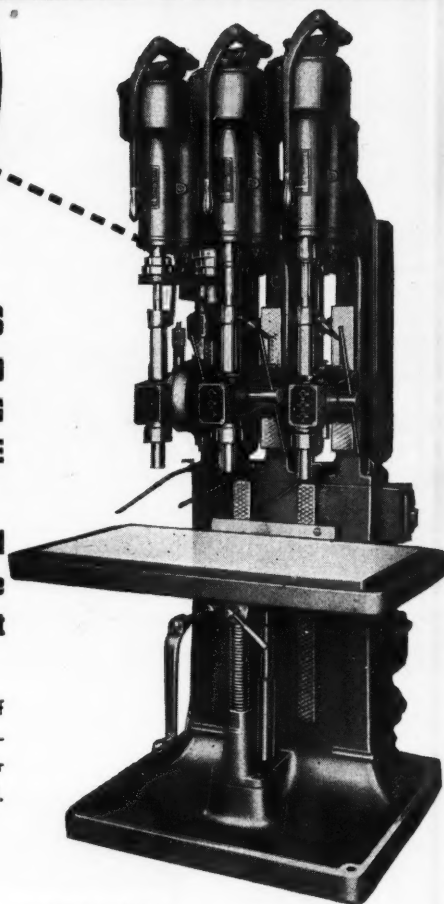
Dog control for depth — maintaining accuracy of depth within one-half revolution of the spindle — or emergency relief lever used to reverse motor if necessary before tapping cycle is completed.

Type MA-6 is made in following capacities:

No. 2 — $\frac{3}{8}$ " capacity in cast iron.

No. 3 — $1\frac{1}{4}$ " capacity in cast iron.

THE AVEY DRILLING MACHINE CO.
CINCINNATI • OHIO • U. S. A.

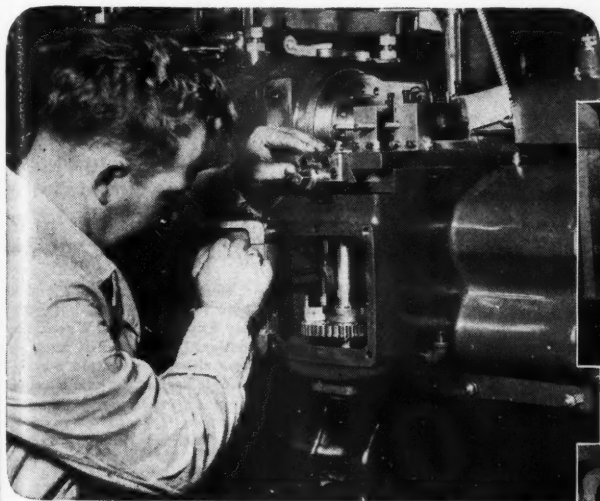


THREE SPINDLE No. 2
TYPE MA-6 • COMBINATION MACHINE
1st Spindle • Avey-matic Feed
2nd Spindle • Hand Feed
3rd Spindle • Tapping (Reversing Motor)

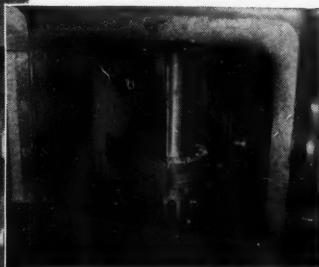


MACHINE OF THE MONTH

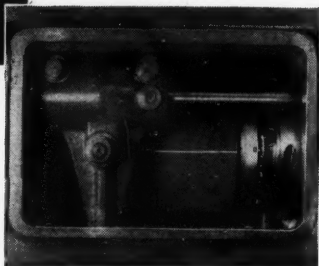
PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



Close-up view of Simplified Change-Over Mechanism.



Close-up view of drum cam showing index line and graduated adjustment ring.



ALL Lo-swing AUTOMATIC LATHES PROVIDE FOR SIMPLE CHANGE-OVER FROM JOB TO JOB

Production men appreciate the speed and simplicity with which all automatic Lo-swing Lathes can be changed-over from job to job. A hinged door on the Model "LR" provides easy access to the Simplified Change-Over Mechanism located on carriage front. Simply loosen two cap screws and move gear segment to graduation on scale corresponding to desired length of cut in inches. Tighten cap screws, and carriage is timed for the job at hand. Cam is standard and does not have to be changed, and since the cycle is closed and locked, machine cannot get out of time.

All Lo-swing Automatic Lathes now have this Simplified Change-Over Mechanism as an inbuilt feature.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

Rapid traverse adjustment is accomplished with equal ease and speed thru the hinged door at the head end of machine. Loosen two cap screws and slide the ring which is graduated in inches around until the length of cut desired in inches is opposite the zero mark. This automatically positions the rapid traverse control cams so that the remainder of the cycle is completed in rapid traverse. A Rapid Traverse Control Handle, conveniently located just below the door opening, further facilitates this adjustment and reduces change-over time.

DAVIS CAR WHEEL

boring



Davis Micrometer Expansion Car Wheel Boring Tools

5 different type tools meet requirements of all shops to speed production and lower wheel boring costs... adaptable to any car wheel boring machine



Car wheel boring is speeded on this machine through the use of a Davis Special "Two-In-One" Type Car Wheel Boring Tool.

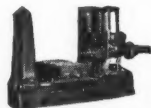
Whatever type of car wheel boring machine you now use, it is possible to bore more wheels in less time by using Davis Micrometer Expansion Car Wheel Boring Tools. These specially designed tools simplify boring and chamfering operations on either new or old wheels. In many instances only a single pass of the tool is required depending upon the type of machine and the Davis boring tool used. Greater wheel production in railroad shops now means more operating cars and increased revenue.

DAVIS MICROMETER EXPANSION UNIT ARRANGEMENT

Adjustment of cutters to bore size is easily made in thousandths through a graduated main screw operating an expanding wedge which controls cutter movement. A wide range of bore diameters is obtainable with each boring tool when equipped with two sets of cutters.

These tools are made with rough turned shanks so they can be machined to fit the ram of any type car wheel boring machine. Finish machined shanks may be had upon request.

Davis car wheel boring tools may be the solution to your wheel boring problems. Our experienced engineering staff is ready to analyze your car wheel boring needs and recommend the correct Davis Boring Tools for maximum production. An outline of your problems will bring an immediate reply.



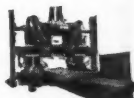
G. & L. Table Type Machine



G. & L. Floor Type Machine



G. & L. Planer Type Machine



G. & L. Multiple Head Type Machine

GIDDINGS & LEWIS MACHINE TOOL CO

tools

GIVE YOU

MORE WHEELS

MORE ROLLING STOCK

MORE REVENUE

SELECT THE TYPE DAVIS CAR WHEEL BORING TOOL YOU NEED

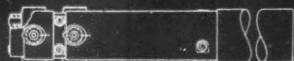
1. THE STANDARD TYPE

is especially suited for those shops having a limited number of wheels to bore. It is highly adapted to earlier model car wheel boring machines having restricted ram travel.



2. THE REGULAR "TWO-IN-ONE" TYPE

is highly practical for use on older type car wheel boring machines with limited ram travel. This boring tool has a double arrangement of cutters and is so constructed that when rough boring and chamfering operations are completed, the tool is withdrawn and the upper cutters are expanded for finish boring operations.



3. THE SPECIAL "TWO-IN-ONE" TYPE

is universally used with newer machines having increased ram travel. The double arrangement of cutters is so spaced that roughing, finishing and chamfering operations are completed in a single pass of the tool.



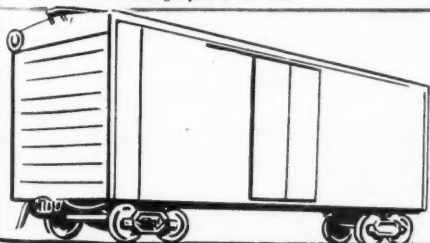
4. THE EXTRA "TWO-IN-ONE" TYPE

has its double arrangement of cutters properly spaced to permit the lower roughing cutters to bore through an eight inch hub before the finishing cutters enter. After the finishing cutters pass through, the single upper cutter chamfers the wheel thus performing three operations in one.



5. THE HEAVY DUTY SPECIAL "TWO-IN-ONE" FOUR CUTTER TYPE

is designed for maximum production on the latest model car wheel boring machines. This tool has four roughing cutters and two finishing cutters all micrometer adjusted. Spacing of cutters permits boring and chamfering operations in a single pass of the tool.



Now.

—you may obtain complete

Free

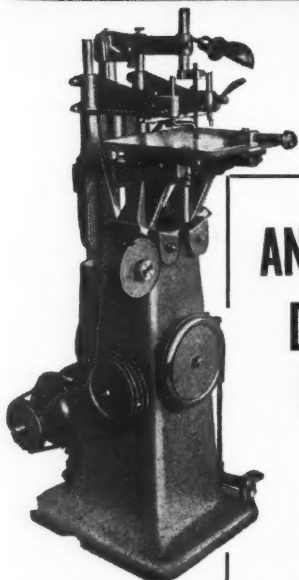
information on Davis Expansion Boring Tools for all railroad boring operations. Write today for Bulletin MM76

DL CO 146 Doty Street • Fond du Lac, Wis.

July, 1946

MODERN MACHINE SHOP 25

Economical • Efficient • Accurate



Extremely fast on sawing, filing and lapping operations the Oliver of Adrian Die Making Machine cuts direct labor cost 50% to 60% in making dies, gages, templates and cams.

AN OLIVER DIEMAKING MACHINE

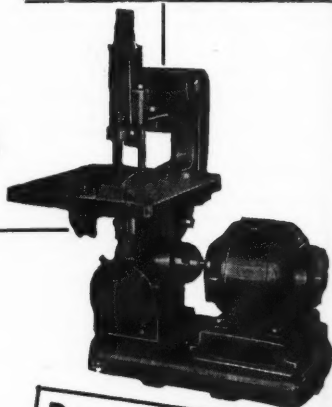
IN EVERY
TOOLROOM

ABOVE . . .

Heavy Duty . . . Saws, files, laps tool steel up to 3" thick. Permits sawing to center of 20" circle. Table 14" square tilts 15° to right, left and front . . . Strokes 0" to 5" with speeds from 100 to 300.

BELOW . . .

Bench type S-1 is direct motor driven, connected to pinion shaft through an improved universal coupling. Saws, files, laps tool steel up to 1" thick . . . Saws to center of 17" circle. 10" square table tilts 10° right, left and forward.



**Don't Neglect
Your Toolroom
It's the Backbone
of Production!**

OLIVER INSTRUMENT CO.

1430 E. Maumee St., Adrian, Mich.

Write for Illustrated Literature.

Oliver OF ADRIAN

AUTOMATIC DRILL GRINDERS—TOOL
AND CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

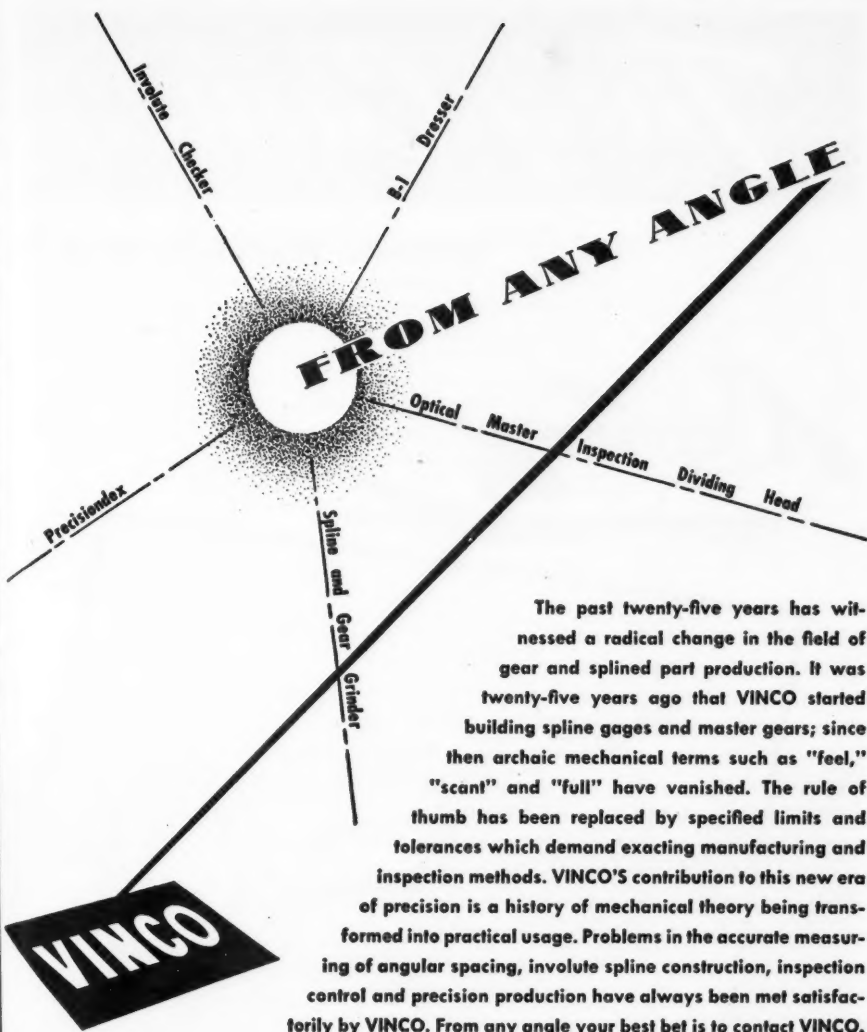
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TOOL
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PLATE
MILL
MACHINES



The past twenty-five years has witnessed a radical change in the field of gear and splined part production. It was twenty-five years ago that VINCO started building spline gages and master gears; since then archaic mechanical terms such as "feel," "scant" and "full" have vanished. The rule of thumb has been replaced by specified limits and tolerances which demand exacting manufacturing and inspection methods. VINCO'S contribution to this new era of precision is a history of mechanical theory being transformed into practical usage. Problems in the accurate measuring of angular spacing, involute spline construction, inspection control and precision production have always been met satisfactorily by VINCO. From any angle your best bet is to contact VINCO.

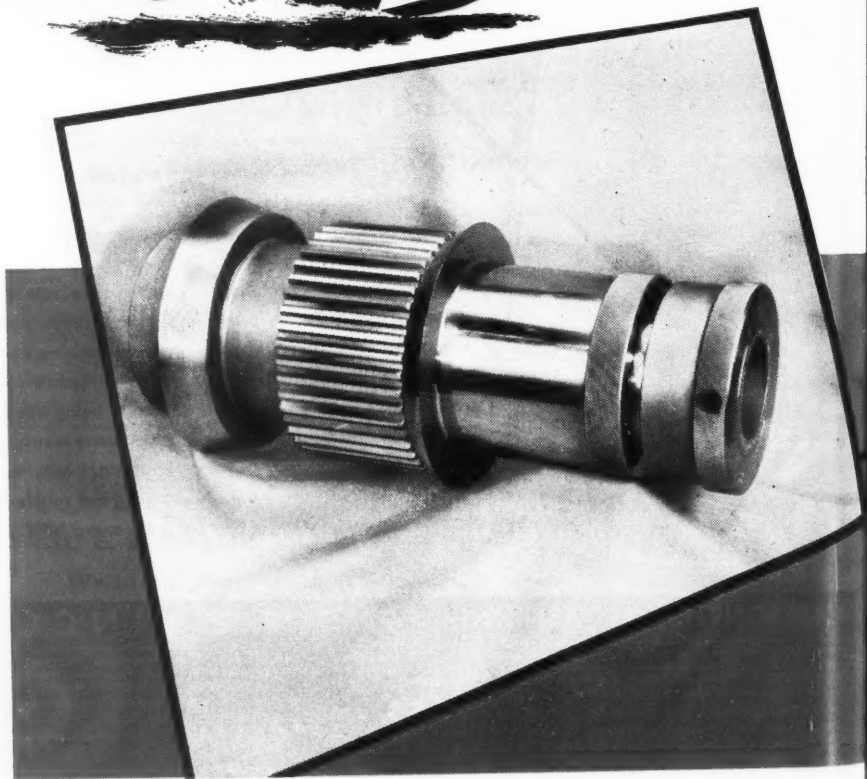
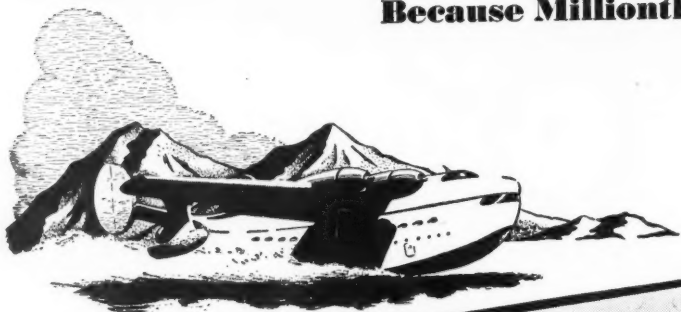
MILLIONTHS OF AN INCH FOR SALE BY VINCO

VINCO CORPORATION, 8881 SCHAEFER HIGHWAY, DETROIT 27, MICHIGAN; SALES OFFICES, NEW YORK, CHICAGO, CLEVELAND

Semi-Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent to Radius Dresser • Index Plates • Precision Vises • Sine Bars • Straight-side Spline, Serration Spline, Involute Spline and Helical Spline Plug and Ring Gages • Plain Cylindrical Plug and Ring Gages • Thread Plugs, Rings and Setting Plug Gages • Spur and Helical Master Gears • Munition Gages • Propeller Shaft and Hub Gages • Built-up and Special Gages • Gear Rolling Inspection Fixtures • Indexing Fixtures • Hydraulic Power Control, Utilization and Distribution Units • Engineering, Design and Development • Precision Production Parts.

They Came to

Because Millionths of an Inch



to VINCO

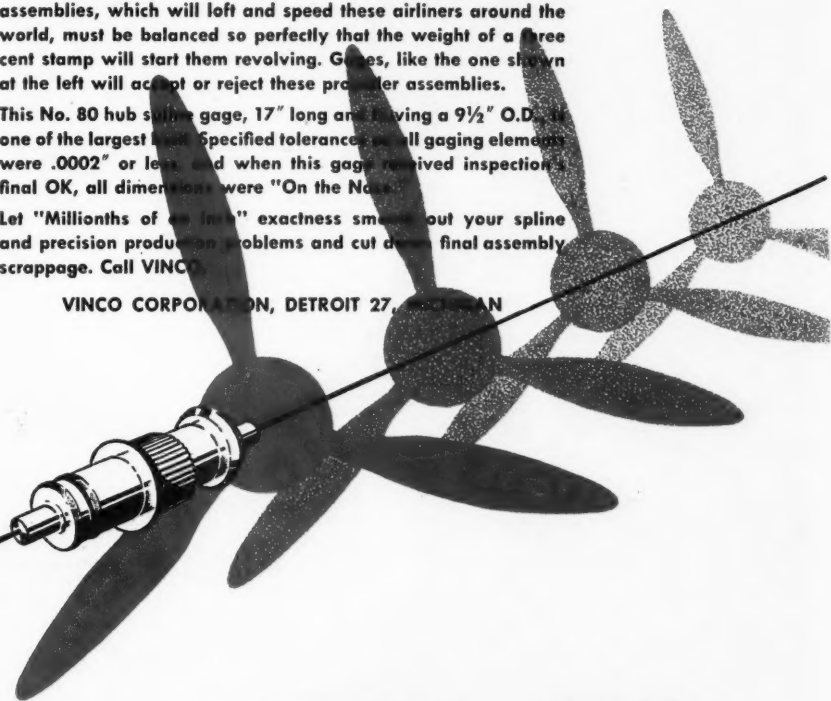
Incl was a key to continued progress . . .

progress personified by the sleek, luxurious airliners about to make their debut to the world. The huge propellers and hub assemblies, which will loft and speed these airliners around the world, must be balanced so perfectly that the weight of a three cent stamp will start them revolving. Gages, like the one shown at the left will accept or reject these propeller assemblies.

This No. 80 hub spline gage, 17" long and having a $9\frac{1}{2}$ " O.D. is one of the largest built. Specified tolerances on all gaging elements were .0002" or less, and when this gage received inspection's final OK, all dimensions were "On the Nose".

Let "Millionths of an inch" exactness smooth out your spline and precision production problems and cut down final assembly scrappage. Call VINCO.

VINCO CORPORATION, DETROIT 27, MICHIGAN



A department devoted to pilot line and experimental manufacture has been added to VINCO SERVICES. This is an outgrowth of an increasing customer demand for VINCO accuracy and finish on work of this nature. For more detailed information contact us directly, or call your VINCO representative.

Use HIM...and the



A good rule for good distributor service...CALL IN your

the picture is complete



Key figure in modern efficient buying, your local CARBORUNDUM distributor offers prompt intelligent service for your abrasive requirements. No one is in better position to give you what you want, how you want it, and when you want it. From large and varied assortments of standard types, sizes and shapes, your order for wheels, coated abrasives, and sticks by CARBORUNDUM receives immediate attention.

Prompt delivery is assured. Delays are eliminated. There is no need, on your part, to carry extra large inventories.

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variety of problems. Often he is able to offer a new solution. And when the situation is unusual or complicated, he can always call in a CARBORUNDUM abrasive engineer for practical assistance.

In the handling of abrasive products by CARBORUNDUM, your industrial supply distributor is backed by outstanding product reputation. These abrasives often help to do a better job, faster and cheaper.

Remember, for standard applications, your CARBORUNDUM distributor can give you the right abrasive product for the job—*plus* unexcelled sales service. The next time a CARBORUNDUM distributor's representative calls, give him the opportunity to explain the benefits you obtain from dealing with this ideal source of supply for abrasives. The Carborundum Company, Niagara Falls, New York.



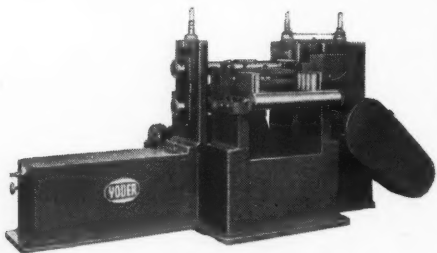
CARBORUNDUM DISTRIBUTOR

TRADE MARK

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

Yoder Coil-Strip Machinery*

Modernizes "Sheet Metal" Processing

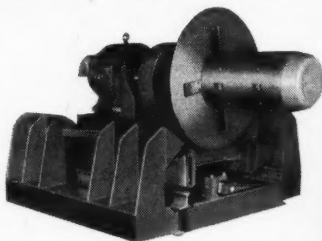


*For Gang-Slitting Mill Widths

YODER metal slitting equipment converts mill widths 12" to 120" into thousands of production sizes, handling shim stock or heavy gauges with equal efficiency. Easy loading, precision slitting throughout the run, convenient recoiling and unloading of slit stock, high speed, one-man control and other features make this the most widely used and best liked equipment in the industry. Coil, sheet or combination slitters, edge trimmers or complete slitting lines available to fit every slitting or trimming requirement.

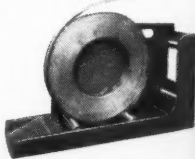
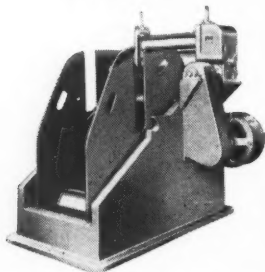
*For Coiling or Uncoiling Strip

YODER uncoilers and recoilers virtually set a standard in the metal handling industries, for the very practical reason of the ease and efficiency with which they handle any type of metal from the extreme light to heaviest coils milled. Sturdy roller bearings assure smooth feed and minimum power requirement in all sizes. Expanding drum types available with power or manual expansion. Pull-out types have adjustable drag brake to control unwind. Wide variety of powered types include a patented high speed double drum recoiler. Swivel mounting of drums permits unloading of finished coils while machine is winding next load. Yoder uncoilers and recoilers are designed for single or gang coiling.



*For Coil-Feeding Processing Machines

YODER coil boxes, too, are widely popular wherever coils are handled. Large sizes may be had with power driven pull-out pinch-rolls. The Yoder "idle roll" coil box affords the simplest and in many cases the best mounting of coils for automatic feeding in such production as blanking, stamping, roll forming or other continuous processing. The coil rides on tubular steel rollers, mounted in sealed, grease packed ball bearings. (See view at right.) Nine sizes with adjustable sides provide strip



capacities from one inch to 38", 2,300 lbs. to four ton capacity. All feed smoothly to the end, are easy to reload with minimum down time.

Ask for bulletin G-451 describing all Yoder special machinery.

ENGINEERING

YODER

MANUFACTURING

The **YODER COMPANY**

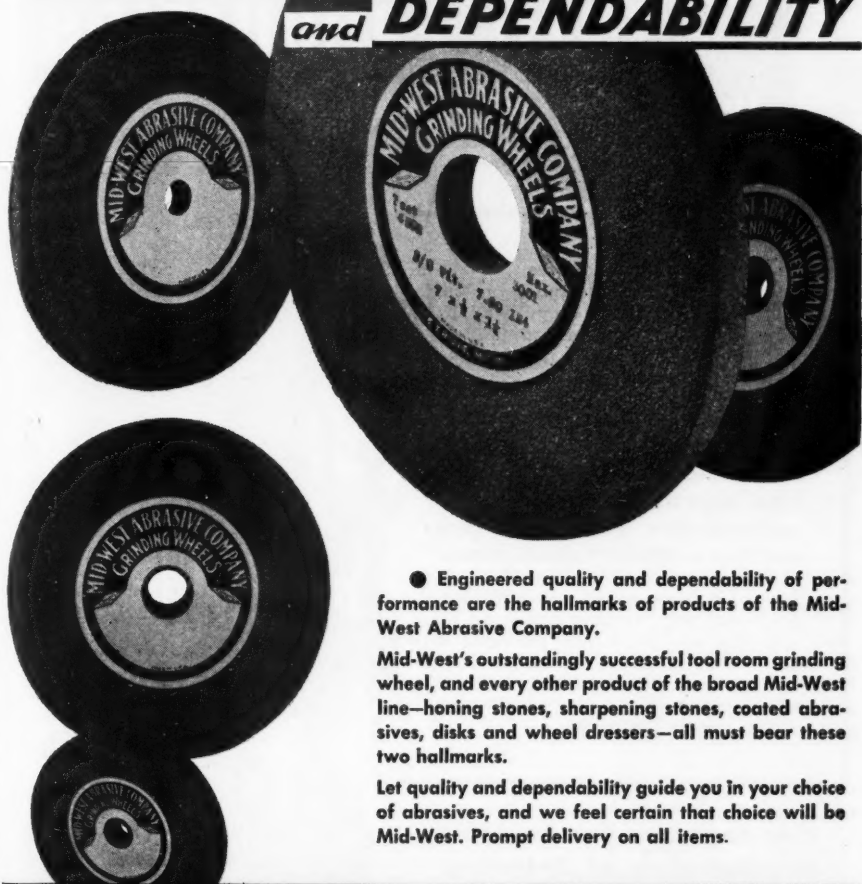
METAL WORKING PRODUCTION MACHINERY

5532 Walworth Ave.

Cleveland 2, Ohio

QUALITY

and DEPENDABILITY



● Engineered quality and dependability of performance are the hallmarks of products of the Mid-West Abrasive Company.

Mid-West's outstandingly successful tool room grinding wheel, and every other product of the broad Mid-West line—honing stones, sharpening stones, coated abrasives, disks and wheel dressers—all must bear these two hallmarks.

Let quality and dependability guide you in your choice of abrasives, and we feel certain that choice will be Mid-West. Prompt delivery on all items.

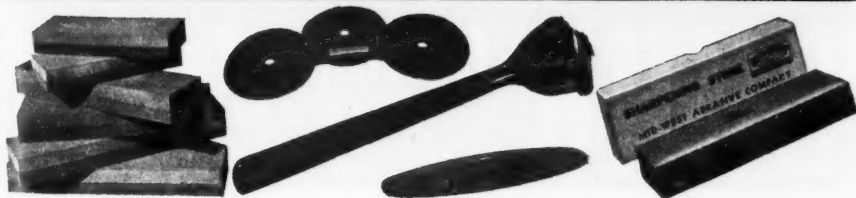
MID-WEST ABRASIVE CO.

Manufacturers of DEPENDABLE Abrasives

Owosso, Mich.

Detroit

Rochester, Pa.



July, 1946

MODERN MACHINE SHOP 33

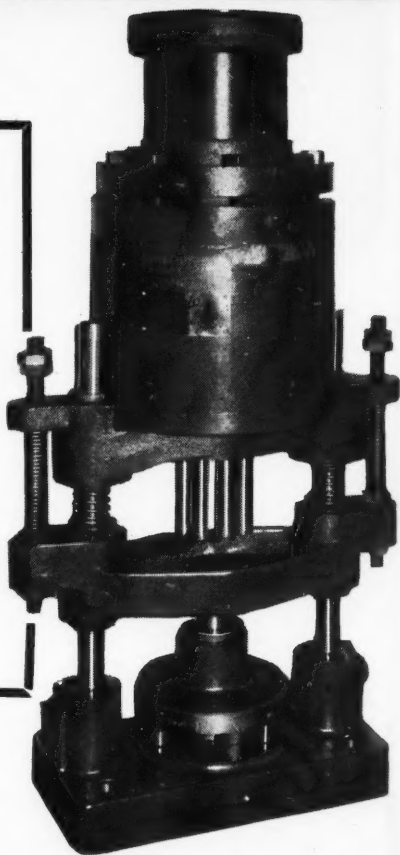
Get IDLE EQUIPMENT INTO PRODUCTION

With BUHR
TOOL-UPS

"Plus Production" signifies that the equipment has been designed by Buhr qualified production engineers and built by Buhr specialists in multiple spindle drilling, tapping and reaming equipment.

All gears in Buhr Equipment are shaved and induction hardened for quieter, frictionless operation, lower power consumption and more production without "down time."

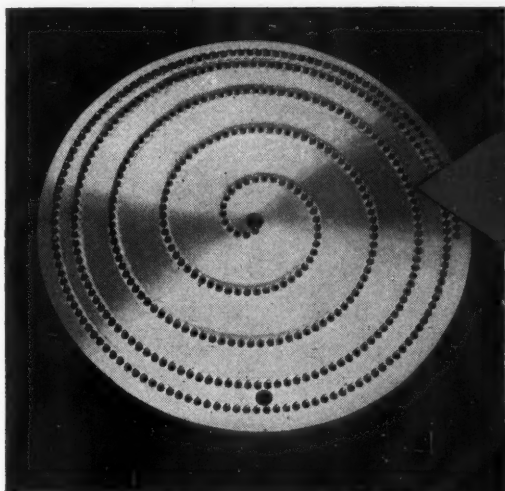
Typical Buhr retooling is this 8-spindle drill head with Bushing Plate and Fixture for one part and provides an adapter to fit the Fixture for holding a mating part. **THUS TWO DIFFERENT PARTS ARE DRILLED FROM ONE PIECE OF EQUIPMENT.**



**Buhr Engineers Are Available
for Discussion of Retooling.
Write Us About Your Problem
Or Send Blue Prints.**

BUHR Machine Tool Co.

845 GREEN ST.
ANN ARBOR, MICH.



Demonstrating

Precision!

437 HOLES!

"one of the most intricate jobs we have done," says

FAIRCHILD CAMERA AND INSTRUMENT CORP.

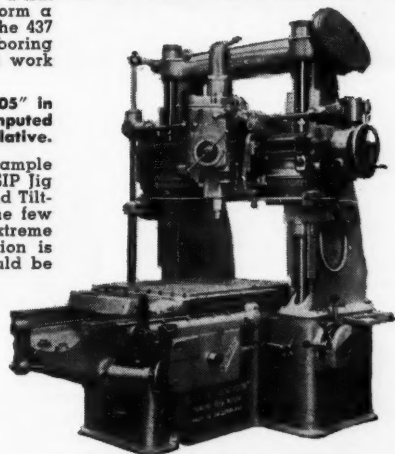
The part is a sine cam for an automatic computer, a flat aluminum disc upon which extruded gear teeth form a spiral path. A SIP Jig Borer was used for boring the 437 holes in the dies for extruding these teeth, and for boring similar holes in the gage on which the extruded work was checked.

The spiral tooth position was held to within $\pm .0005$ " in radial location and to within 30 seconds of the computed location in angular position, tolerances not accumulative.

Unusually high precision? Yes, but it is a typical example of the precision and convenience of operation of SIP Jig Boring Machines in connection with SIP Circular and Tilt-able Tables. In fact, the SIP Jig Borer is one of the few existing machines capable of working to such extreme limits of accuracy. Whenever the highest precision is needed, achieve it with a SIP Jig Borer. We would be pleased to have your engineers consult with us.

Range of Table Sizes

No. 2C	18"x10 $\frac{3}{4}$ "
No. 3K	21 $\frac{1}{2}$ "x15"
Hydroptic-B (illustrated) ..	39 $\frac{1}{2}$ "x32"
No. 4G	27 $\frac{1}{2}$ "x23 $\frac{3}{8}$ "
No. 5G	43 $\frac{3}{8}$ "x32"



HIGH PRECISION MACHINE TOOLS

AND MEASURING INSTRUMENTS

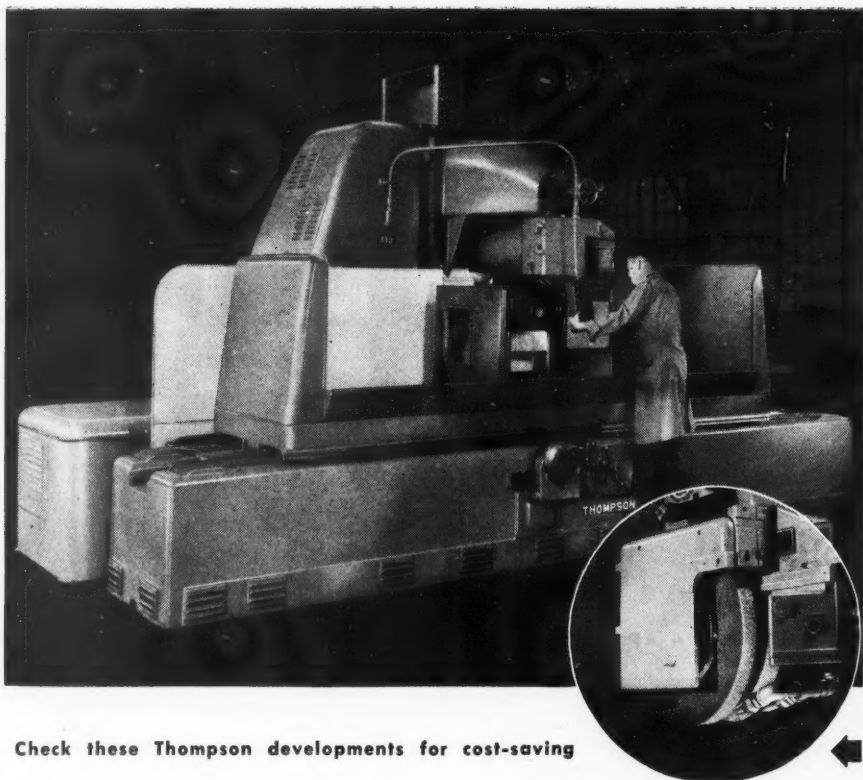
C O S A
CORPORATION



CHRYSLER BUILDING
New York 17, New York

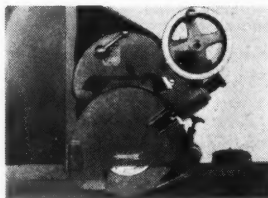
July, 1946

MODERN MACHINE SHOP 35

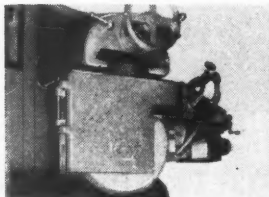


Check these Thompson developments for cost-saving

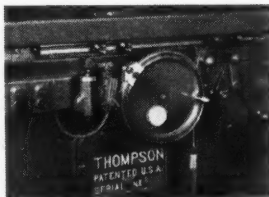
1. Automatic Wheel Truing (pioneered by Thompson). The stationary truer provides instant availability of the truing tool and all wheel head slides are now equipped with hydraulic wheel truing feeds. It is not necessary to disturb the work piece in order to true the wheel.



3. Automatic Down Feed (exclusive Thompson feature). Feed cycle of .00025" to .004" is available at each table reversal for plunge cutting or at each wheel head feed reversal. Feed mechanism has automatic trip—can be pre-set for size control from elevating hand wheel graduations, duplicating accuracy to .0002"



2. Angular Wheel Truing (pioneered by Thompson). Attachment equipped with two truing tools, both sides of the included angle are trued simultaneously. Universal motor with speed variation 5" to 40" p.m. controlled by governor insures accurate, smooth truing for fine finish and precision on piece work.



Before you buy *investigate!*

These 8 Thompson Developments Offer More Exclusive Features to Help Reduce Grinding Costs

You will find most of the important cost-saving developments in surface grinders on Thompson machines because Thompson has been a successful pioneer in this field. All eight of the outstanding improvements described here have been pioneered by Thompson . . . and six of them are exclusively Thompson features.

Check the Thompson line first

In addition to a complete line of hydraulic surface grinders from 6" x 18" to 36" x 240", Thompson offers Broach Grinding

Machines . . . fully automatic and hand feed types for round or flat broaches . . . and the famous new *Thompson Truforming Grinders*, completely engineered units with two crushing rolls permitting practical production of precision flat form contours for the first time. Write for details.

Address Dept. 13

THE THOMPSON GRINDER COMPANY, INC.
SPRINGFIELD, OHIO

Thompson SURFACE Grinders

Type C Grinder (36" x 36" x 96") shown grinding ways of machine bed. Both flat and "vee" type wheels are mounted on wheel head spindle.



4. Automatic Sparkout Control (exclusive Thompson feature). Allows table and wheel head to continue finishing cuts after automatic down feed device has reached pre-determined size. At fixed time after work size is reached, table rapid traverses to loading position and stops automatically. Usually furnished in conjunction with automatic

down feed. This device maintains accurate duplication of dimensions and makes possible battery installations by releasing operator for loading other machines.

5. Flame Hardened Bearings (exclusive Thompson feature). Wheel head slide ways are flame hardened and precision ground for permanent accuracy.

6. Pressure Lubricated Spindles (exclusive Thompson feature). Direct-powered wheel-head spindle of heat-treated alloy steel in silver-lined bearings is permanently vibration-free. Positive automatic pressure lubrication is provided by pump inter-locked with spindle motor.

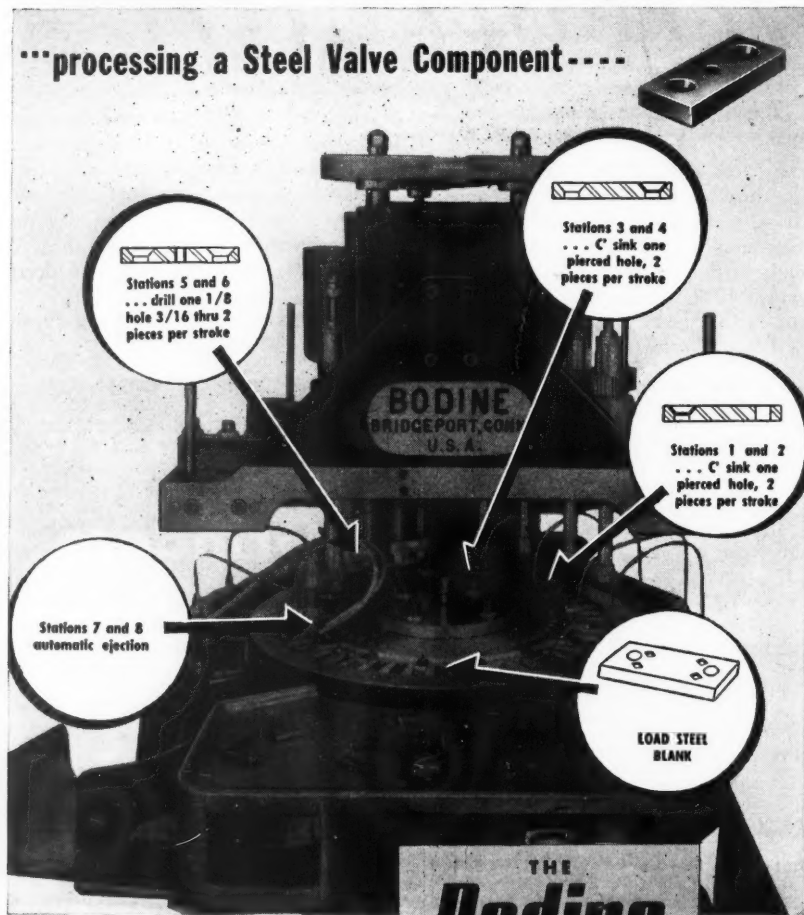
7. Anti-Friction Elevating Unit (exclusive Thompson feature). Friction between screw and nut is reduced 70% to permit accurate feeding to .0001". Also minimizes effort of moving saddle assembly when making new setups without power elevation. Permits inexperienced operators to finish work by following handwheel graduations.

8. Double-Length Bed (exclusive Thompson feature). Massive double-length solid-cast beds are provided with heavy cross-section and numerous ribs at vital points to provide absolute rigidity for table.

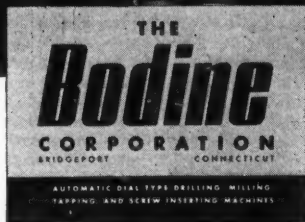
COPYRIGHT 1946
THE THOMPSON GRINDER CO. INC.

Bodine..Case History Nº 17

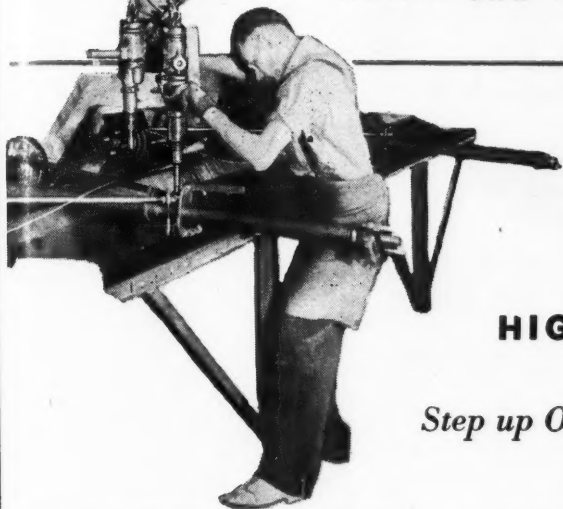
...processing a Steel Valve Component...



• Production 1800 pieces per 50 minute hour...2 pieces per stroke on this Bodine 6 spindle Drilling Machine. Bulletin on request.



WHERE YOU DO THE SAME JOB
AGAIN *and* AGAIN *and* AGAIN



Thor

**HIGH FREQUENCY
TOOLS**

Step up Output at Lower Cost

Operating on 180-cycle current, Thor High-Frequency Electric Tools maintain virtually *constant speed* under load; have *more power* per pound; are light, compact and *easier to handle*. Running at unvarying, full-rated speed, the tools put out more work in relation to power put in . . . reducing operating cost. Maintenance costs are lower, too, because high-frequency tools have fewer motor parts—all extremely simple and subject to little wear.

If you use a total of ten or more tools—for drilling, reaming or tapping; grinding, sanding or polishing; screw driving or nut setting—find out whether Thor High-Frequency Electric Tools will pay you. A Thor Engineer can give you an *unbiased* answer . . . because Thor makes *all types** of portable power tools.

INDEPENDENT PNEUMATIC TOOL CO.

600 W. Jackson Blvd., Chicago 6, Illinois

Sales and Service Branches in Principal Cities

Thor

PORTABLE POWER

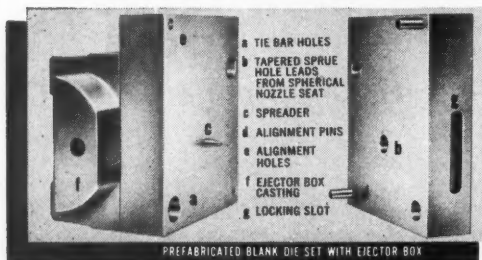
TOOLS

*PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

DIE CASTING

comes
into your
machine
shop!

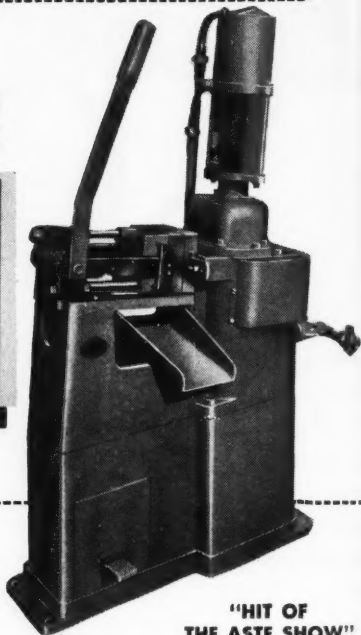
SAVE MONEY NOW ON SMALL RUNS WITH
THIS HIGH SPEED, LOW COST MACHINE



PREFABRICATED BLANK DIE SET WITH EJECTOR BOX

STANDARDIZED PREFABRICATED DIE SETS
MEAN QUICK INEXPENSIVE DIES

Here's a die casting machine so simple, so inexpensive, that it is fast becoming a standard machine tool. With the DCMT Die Casting Machine you can make high speed production runs or small quantities of die castings in your own machine shop.



"HIT OF
THE ASTE SHOW"

low equipment cost: Your Machine Tool Dealer handles the DCMT machines which cost no more than a bandsaw, small engine lathe or similar tool room equipment.

inexpensive dies: The same dealer supplies prefabricated die sets complete except for die cavity and gates. All die maker must do is sink die cavity and gate. Thus, average die cost is comparable to that of a good blanking die.

high speed production: An operation speed of 500 shots per hour makes it possible to use single cavity dies for high production.

small runs economical: Runs as low as 250 die cast parts can be produced economically on the DCMT machine.

simple operation: Extreme simplicity of design and construction makes for easy operation and maintenance even by unskilled personnel. Dies can be changed in 2 to 3 minutes.

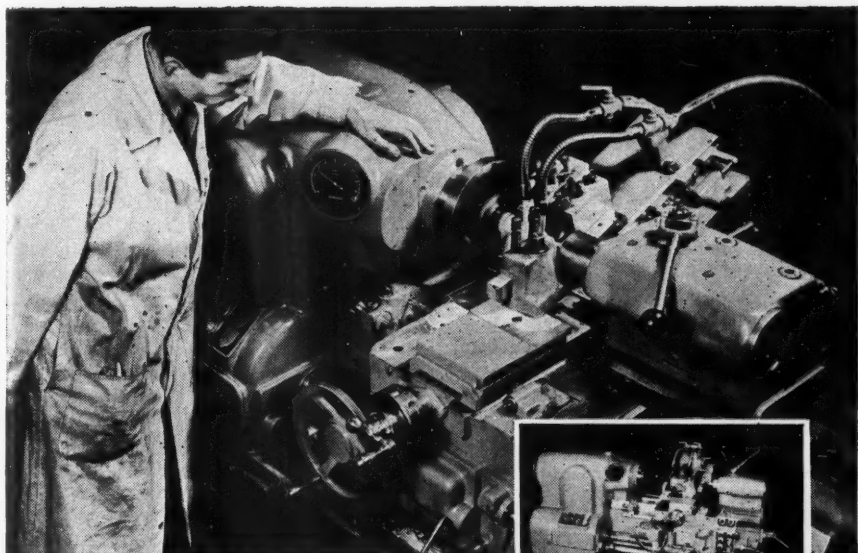
close tolerances: Exact duplication of parts is assured while a general tolerance of $\pm .002$ is easily maintained.

SEE YOUR LOCAL MACHINE TOOL DEALER
OR WRITE FOR CATALOG & TECHNICAL
LITERATURE.

DCMT

SALES CORPORATION

Dept. E-2, 401 Broadway
New York 13, N. Y.



You'll get peak production AT A PROFIT—with the *Mona-Matic**

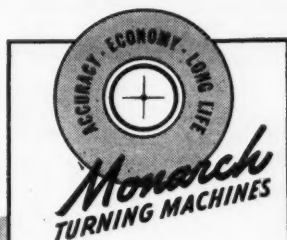
Fully automatic cycle—or fully manual—or any combination. Between-centers work as fast as carbide tools and modern metals can take it—spindle speeds up to 1000, 2000, 3000 and even 5000 RPM.

That's the kind of work you can do on the Mona-Matic. You'll get floor-to-floor time you'd ordinarily think of only in connection with specialized, one-purpose machines—and at the corresponding low machining costs usually restricted to mass production methods.

Yet, with the Mona-Matic, you'll have an almost universally adaptable machine. The front carriage is built with power feed and rapid traverse return; the independent, electrically controlled rear slide may be added as a separate unit.

* **MONA-MATIC**—Add this new name to your metal-turning dictionary—You'll be hearing a lot of it—wherever rising production costs are a factor. The *Mona-Matic* is Monarch's answer to this problem in the field of between-centers work. Get full details *now*—from your nearest Monarch representative—or write us direct.

**The Monarch Machine Tool Co.
Sidney, Ohio**



**Write
FOR
YOUR COPY**



AAE
ROTO-CLONE
DUST CONTROL



ROTO-CLONE DUST CONTROL
SKIMMER PRECLEANER

ROTO-CLONE DUST CONTROL
TYPE D—PORTABLE GRINDING

ROTO-CLONE DUST CONTROL
TYPE D—SWING FRAME GRINDING

ROTO-CLONE DUST CONTROL
TYPE D—METAL FINISHING

ROTO-CLONE DUST CONTROL
TYPE W—FOUNDRY SAND CONDITIONING

GENERAL AIR ENGINEERING DATA

This valuable booklet contains pictures, charts, specifications and text covering the Roto-Clone method of process dust control as applied to a wide variety of industrial dust problems. Complete descriptions of each of the four types of Roto-Clones point up their greater simplicity, increased efficiency, compactness and lower operating costs. You can request your copy without obligation.

AMERICAN AIR FILTER COMPANY, INC.
Incorporated
100 CENTRAL AVE., LOUISVILLE 8, KY.
In Canada:
Darling Bros., Ltd., Montreal, P. Q.



AAE
ROTO-CLONE
FOR PROCESS DUST CONTROL

ROTO-CLONE IS A REGISTERED TRADEMARK FOR A DYNAMIC PRECIPITATOR OR HYDROSTATIC BAFFLE TYPE WET COLLECTOR



Ever See a Saw Fly?

DoALL
Precision

Saw bands running at speeds up to 3 miles per minute—as fast as you can ride in a plane. That's friction sawing, the new metal-cutting process where high saw speed softens metal for quicker, easier removal.

Only the toughest blade with ultra-hard teeth on a durable, flexible back can endure the strain. DoALL Precision Blades can take it for days—make friction sawing economical.

At slower speeds Precision Blades remove narrow chips from metal—like hundreds of shaper tools biting in rapid succession. They hold the line to within .005".

For wood, plastics, soft metals and alloys or non-ferrous metals, DoALL Butress Blades cut faster and wear longer—all-purpose miracle blades that never falter.

For sawing problems consult the DoALL Research Laboratory. Its service is free. Just write.

DoALL
Butress

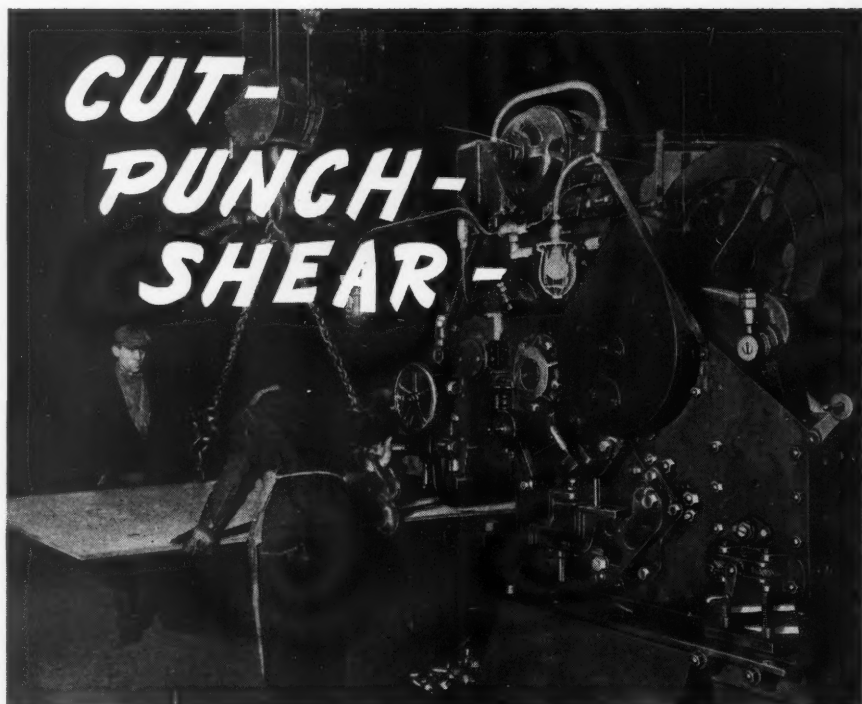


The **DoALL** *Company*



DoALL STORES
PRINCIPAL CITIES

SMALL TOOL DIVISION
DES PLAINES, ILLINOIS



with SPEED, ACCURACY, ECONOMY...

Are you familiar with the amount of work which can be done on a Buffalo Universal Iron Worker? This versatile three-machines-in-one provides punching, notching, coping and shearing facilities on a wide range of stocks, including plates, flats, angles, tees, beams, rounds, squares and special shapes.

Because of the practical "Buffalo" design, three men can work at the machine at one time at these various operations. Cutting and punching is clean and quick, with no burring and minimum deflection of the stock.

Fifteen sizes are available, described in Bulletin 360. Write for your copy.

BUFFALO FORGE COMPANY

388 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Buffalo

**Universal
Iron Worker**

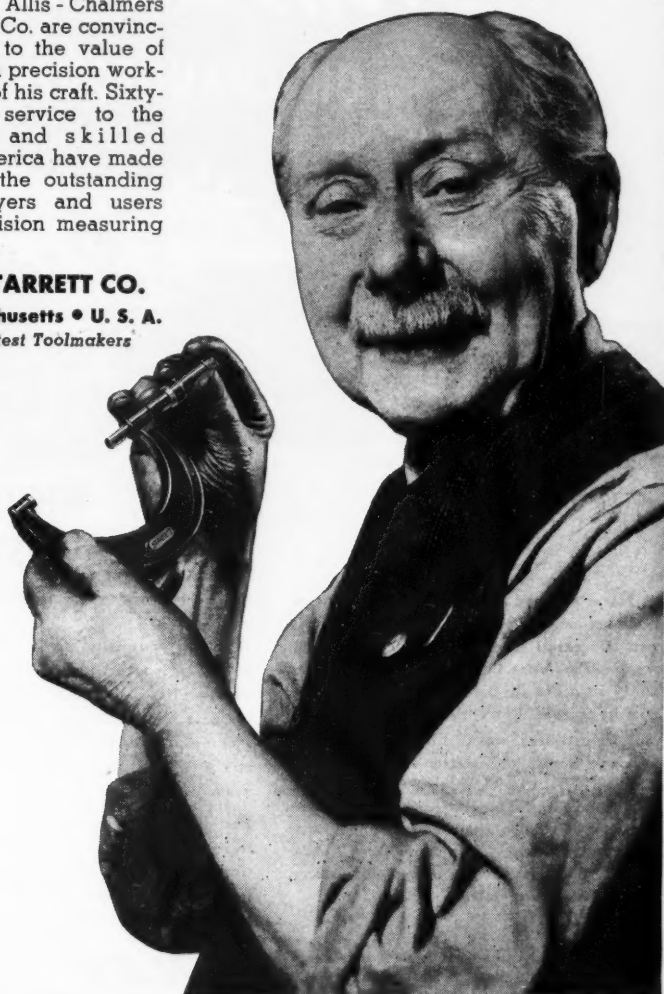
A TIME-HONORED VETERAN OF THE PRECISION WORKER'S CRAFT

Forty-one years of continuous service with Allis-Chalmers Manufacturing Co. are convincing testimony to the value of Olaf Olson as a precision worker and master of his craft. Sixty-six years of service to the manufacturers and skilled workers of America have made Starrett Tools the outstanding choice of buyers and users wherever precision measuring tools are used.

*Photo courtesy
Allis-Chalmers Mfg. Co.*

THE L. S. STARRETT CO.

Athol • Massachusetts • U. S. A.
World's Greatest Toolmakers

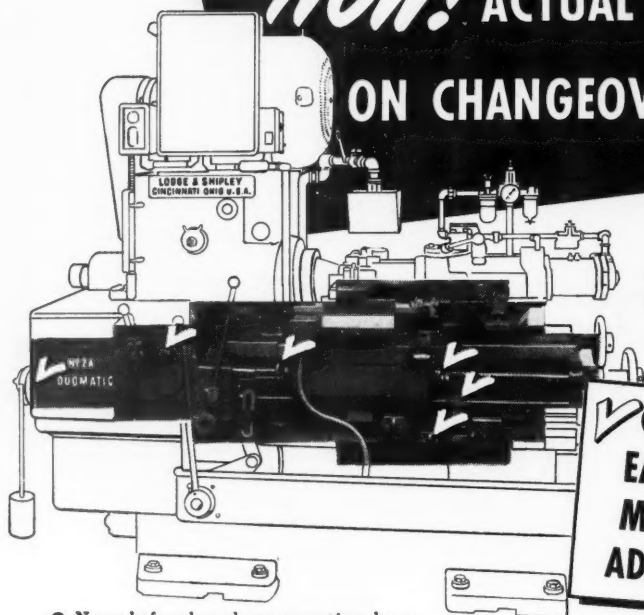


STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • HACKSAWS
METAL AND WOOD CUTTING BAND SAWS • GROUND FLAT STOCK

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NOW! ACTUAL PROFITS ON CHANGEOVER TIME



WITH THE
"JOB SHOP"
DUOMATIC

✓ CHECK THESE
EASY, RAPID
MECHANICAL
ADJUSTMENTS

● Never before has changeover time been cut so sharply. For example, to set-up and run 500 small shafts on an engine lathe required 55 hours. On the 2A Duomatic, the same number of pieces were set-up and run in only 18 hours. **37 HOURS SAVED!** Handle universal work, make unbelievably fast savings in changeover time and production with the 2A Duomatic. There are no cams. Simple, mechanical adjustments (note arrows) eliminate costly, time-wasting cam changes. This "Job-Shop Automatic" performs in minutes work taking hours on engine lathes.

Whether your runs are long or short—50 or 5000 pieces—the 2A Duomatic makes your profits bigger. And you profit further because responsibility is built into the lathe—any unskilled operator can handle the most complex multiple tool jobs with ease.

For detailed information of the 2A Duomatic (for small jobs) and the 3A Duomatic (for larger work) write on your company letterhead for Bulletins 601 and 620.

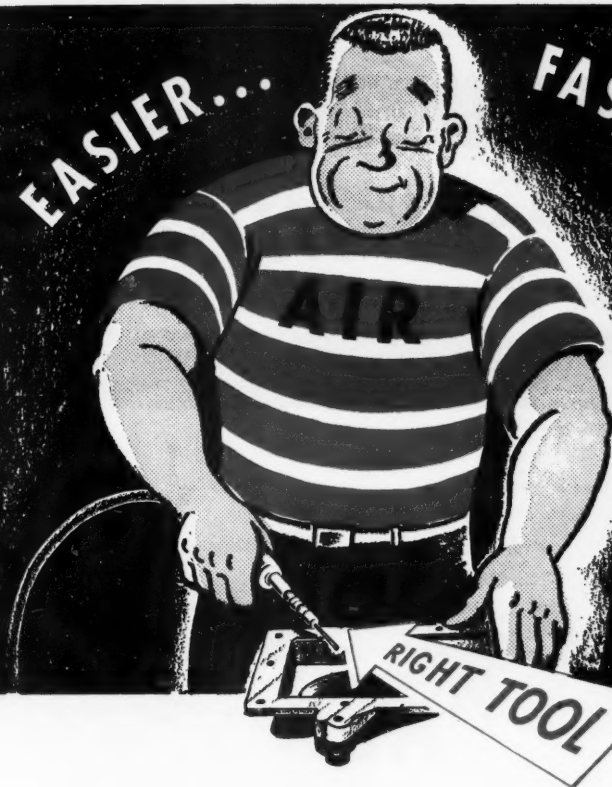
THE LODGE & SHIPLEY
MACHINE TOOL CO.



CINCINNATI 25, OHIO, U. S. A.

MACHINE TOOL DIVISION 3055 COLERAIN AVE. • SPECIAL PRODUCTS DIVISION 800 EVANS ST.

EASIER... FASTER...



CUTS COST 50%

HAND files and scrapers were being used by this manufacturer of railroad equipment for filing sharp machine edges and burrs on bronze castings. The Rotor Application Engineer suggested doing it the easy way with a Rotor M-827 midget grinder with rotary file. This 20,000 R.P.M., 1½ lb. Rotor air tool was installed and gave these results:

50% reduction in burring costs because high-speed, light-weight Rotor midget file doubles production compared to former hand operation.

A more uniform, smoother finish because this rotary power file is easy to handle and reaches places inaccessible with hand files.

Perhaps you have hand filing operations which could be done quicker and better with these high-speed, light-weight tools. Let the Rotor Application Engineer suggest ways to decrease your costs by increasing your output per man per dollar.

Yours for smoother filing,
AIR O'TOOL

THE **ROTOR TOOL** CO.
CLEVELAND, OHIO

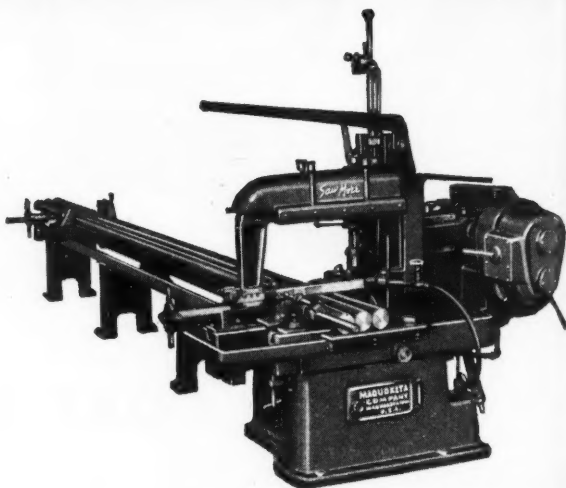


UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

Saw More

METAL CUTTING MACHINES

**Promptly
From
Stock!**



Plant Expansion Assures You Of An Immediate Solution
To Your Metal-Cutting Problems.

CHECK THESE FEATURES:

Positive compensating feed provides for cutting more metal in less time.

Exact duplication of pieces is assured by scale and spacer bar measuring.

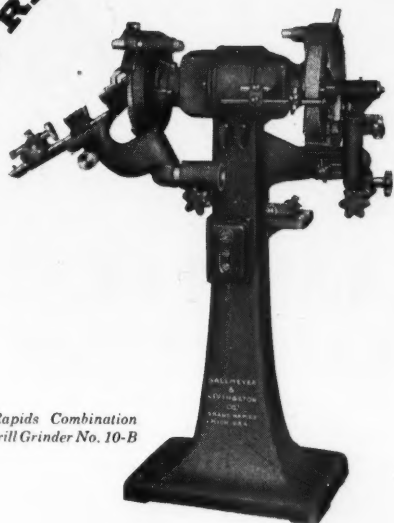
Economical price plus low operating cost make this saw an economical buy.

Write for Details.

MAQUOKETA COMPANY

Maquoketa, Iowa

GRAND RAPIDS GRINDING MACHINES



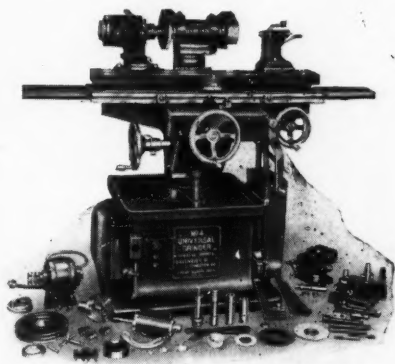
Grand Rapids Combination
Tap and Drill Grinder No. 10-B

DELIVER TOP TOOL ROOM EFFICIENCY

Whether you need a Universal Cutter and Tool Grinder or a Combination Tap and Drill Grinder, you can be sure of top tool room efficiency if they bear the name "Grand Rapids," manufactured by Gallmeyer & Livingston Co.

With the Combination Tap and Drill Grinder you have three ways: 1. On first cost, 2. Through lower maintenance expense, 3. On valuable floor space.

With Grand Rapids No. 4 Universal Cutter and Tool Grinder you can handle complex tool grinding jobs with maximum speed and convenience. **Write now** for Bulletins 544 and G. L. 9-15-44.



Grand Rapids No. 4 Universal
Cutter and Tool Grinder.



What "GRAND RAPIDS" Quality Means: Gallmeyer & Livingston cast their close-grained gray iron, machine to micrometric tolerances, precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means top quality in grinding machinery. **GALLMEYER & LIVINGSTON COMPANY, 308 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.**

Dependable

B-RIGHT-ON

Socket Screw Products



COMPLETE STOCKS . . . HIGHEST QUALITY

Prompt Delivery on Special Socket Screw Products.

If your dealer can't supply you, write to us.

THE BRIGHTON SCREW & MFG. CO.

READING RD. AT DORCHESTER

CINCINNATI 2, OHIO

50 MODERN MACHINE SHOP

July, 1946

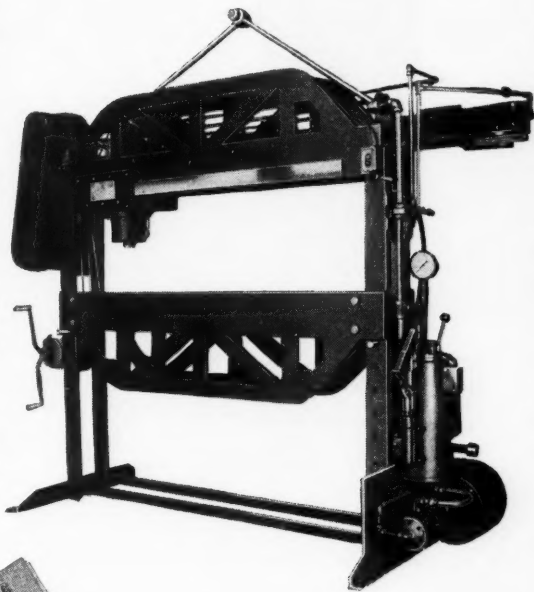
ENGINEERING VISION THAT MEETS THE NEEDS OF OUR SONS...NOT OUR GRANDFATHERS

K. R. Wilson

**NEW KRW SHEET STRAIGHTENING
PRESS SAVES MAN POWER... HIGHLY
FLEXIBLE... DELIVERS ONE TON
OR A HUNDRED WITH THE**

...Flip of a Finger

History books tell about the past. Business... successful business... is built by looking into, and anticipating the needs of the Future. In designing, engineering and manufacturing, KRW builds with tomorrow's needs in mind. That's our idea of Vision. The best proof of practical application can be found in the innumerable adaptations of the basic KRW Hydraulic Arbor Press which have been supplied to industry. The one illustrated on the opposite page is a typical example of KRW engineering vision. Here it has become a high-speed straightening press... supplanting a costlier, labor-consuming method formerly used. Other KRW contributions to low-cost production include Forming Presses... Stretcher Levelers... Forming Brakes... Improved Hydraulic Arbor Presses... all adaptable to either hand operation, Air-Oil operation or Electric motor operation. They are built to finish tonnage pressures ranging from 25 to 200-tons. Their cost is surprisingly low in comparison with other suitable types of conventional equipment. The new KRW catalog gives dramatic proof of KRW engineering superiority. Mail the coupon today.



Specifications

OF BENDING, STRAIGHTENING AND FORMING PRESS ILLUSTRATED

Opening between Upright Members	72"
Maximum Daylight	35"
Minimum Daylight	4"
Cylinder Travel Laterally	48"
Ram Speed Laterally	90"/min.
Ram Travel	7 1/2"
Ram Speed Horizontally	15"/min.
Overall Height	100"
Overall Width	108"
Weight	3700#

**THIS NEW CATALOG
WILL SAVE
YOU Money!**



K. R. WILSON, 215-217 Main Street,
Buffalo 3, N. Y.

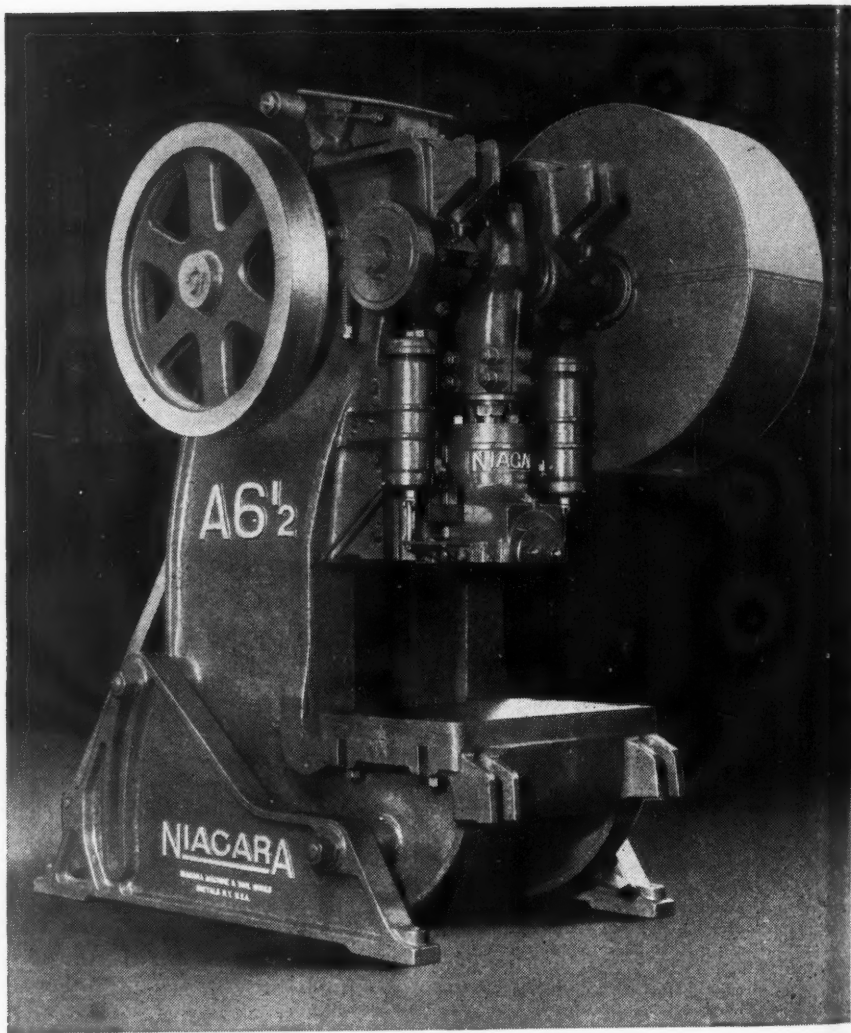
Please mail me a copy of your New
Hydraulic Arbor Press Catalog.

Name

Address

City & Zone State

K. R. WILSON
BUFFALO 3, NEW YORK

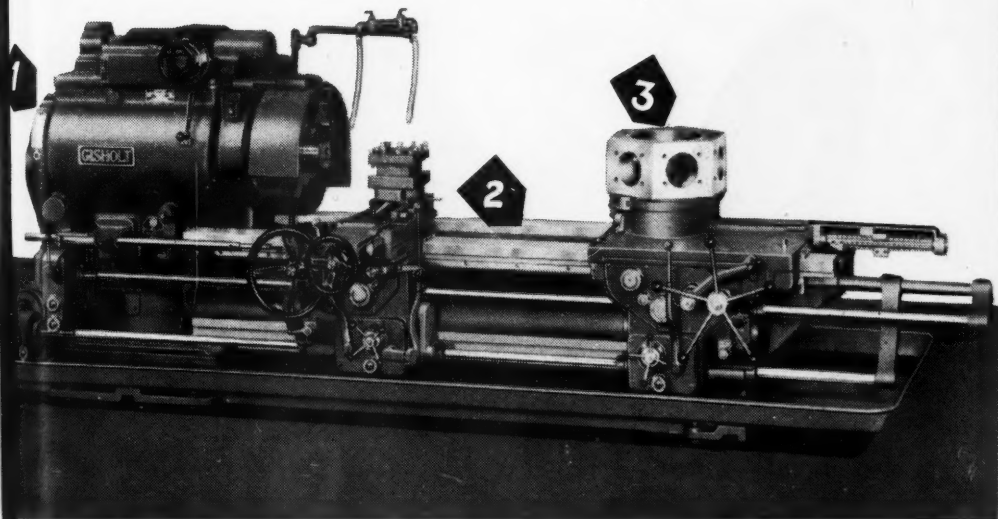


America's Production is being speeded up by the use of Niagara Open Back Inclinable Presses. The No. A-6½ shown above is one of the complete, well graduated Niagara line ranging from 7 to 190 ton capacities. Their many features contribute to **LONG DIE LIFE AND MORE WORKING STROKES PER HOUR**. Complete specifications are given in Bulletin 58, available upon request. Niagara Machine & Tool Works, Buffalo 11, N. Y. District Offices: Cleveland, Detroit, New York.

Why Gisholts retain their **ACCURACY!**

Accuracy is vital in a turret lathe. Would you be satisfied to have it for only a year—or two—or five?

Because experienced users want accuracy to last the life of the machine, we have incorporated these and many other refinements in the design and construction of Gisholt Turret Lathes. We believe, as do Gisholt users, that they more than pay for themselves in greater speed, better performance, less maintenance and lifelong accuracy.



1 Headstock is cast integral with bed for extreme rigidity—to insure accurate, permanent alignment. The heavy forged steel spindle with flanged nose, mounted in double row precision tapered roller bearings at both ends, will carry heavy work at maximum speeds and feeds without deflection or chatter.

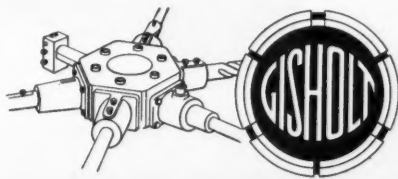
2 Bed ways are of thick block type tool steel, hardened to 64-66 Rockwell C and finish-ground in exact alignment with the spindle. On top, bottom, and both sides these hardened steel ways present a bearing surface that is virtually wear-proof. Automatic pressure lubrication preserves their accuracy.

3 Permanent alignment of the hexagon turret is insured by its massive rigidity, the large bearing surface of the carriage on the hard steel ways with square lock gib construction, and long guide. The turret is accurately positioned in index and rigidly clamped with a powerful, cam-operated binder.

GISHOLT MACHINE COMPANY

1219 East Washington Avenue • Madison 3, Wisconsin

Look Ahead . . . Keep Ahead . . . With Gisholt



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



You Can't Miss with RUBBER-CUSHIONED Brightboy

Are you worrying about your production setup, wondering how you can reduce work-operations? With Brightboy you can burr, finish and polish better and faster — you can **SAVE** and **IMPROVE**.

Ask to have our service representative call, to advise and demonstrate how rubber-cushioned Brightboy can give you a close-tolerance one-operation finishing job. (Brightboy's resilient rubber binder and abrasive work together, in a synchronized operation that bridges the gap between the grind and the buff) . . .

Ask your dealer for Brightboy prices, and the new work data catalog.

TYPICAL Brightboy APPLICATIONS

For damaskeening (spotting) radio panels, cigarette and vanity cases, clock faces and other items where a design finish is desirable, Standard Texture Brightboy Rods are used in regular or multi-spindle drill presses.

On radio tubes, Standard Texture Brightboy Rods are used to remove excess solder and to polish prongs.

On molded plastic items, surplus material and mold marks are being removed with Brightboy wheels. Minimizes loading on wheel face — a welcome time-saver.

To revive finish in areas where mold marks have been removed, Fine-Tex Brightboy Wheels are used, applying white soap on face of wheel for this work.

In the manufacture of **refrigerator motor equipment**, Brightboy breaks burrs on keyway, and polishes drive shaft.

. . . and many other applications — among them polishing worm on stainless steel corkscrew; removing heat stains, finishing (blending), and polishing stainless steel equipment; breaking burr and polishing thread, channel and face on brass and bronze fittings.

**BRIGHTBOY
INDUSTRIAL DIVISION
Weldon Roberts Rubber
Co.**

Newark 7, N. J.

WELDON

ROBERTS

Brightboy

REG. U.S. PAT. OFF.

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BERTS
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July, 1946

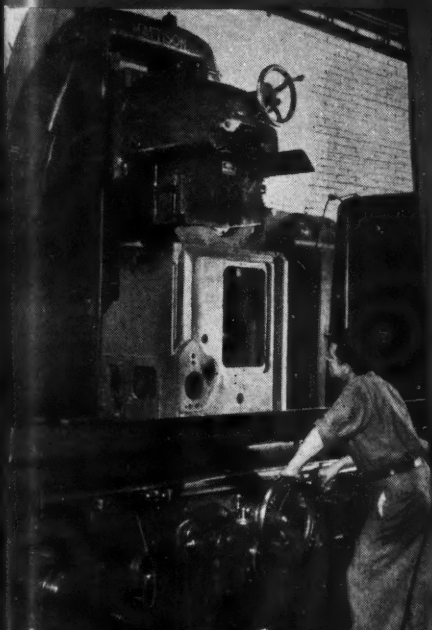
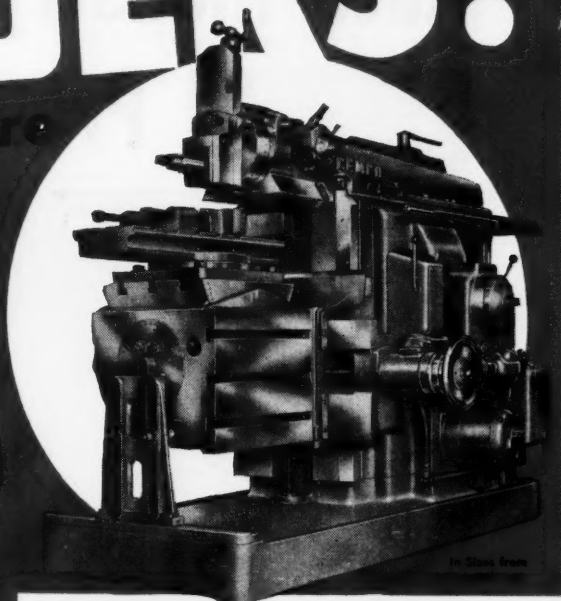
LEADERS!

Because They're

PRECISION
BUILT!

GEMCO

Multi-Purpose SHAPERS



ILLUSTRATED here is only one of many de-
pendable and efficient machine tools that
contribute to the high degree of accuracy, and
easy, quiet, smooth-running operation so char-
acteristic of GEMCO Shapers.

Precision grinding is employed on all GEMCO
ram ways and vertical guides of the column,
the ram, ram gibs, the tool head body, tool
head slide and clapper box, the crossrail, all
table surfaces and table support rail, the vise
base, vise body and hardened jaws, crank
block, crank plate and the "Lubrigard" housing.

Time-tested GEMCO features are: Exclusive
"Lubrigard" Safety Device which increases the
precision life—Centralized controls save time
and effort, increase production—Large easy-to-
read dials—Wide range of feeds and speeds.
GEMCO Shapers save time, cut costs, produce
better work!

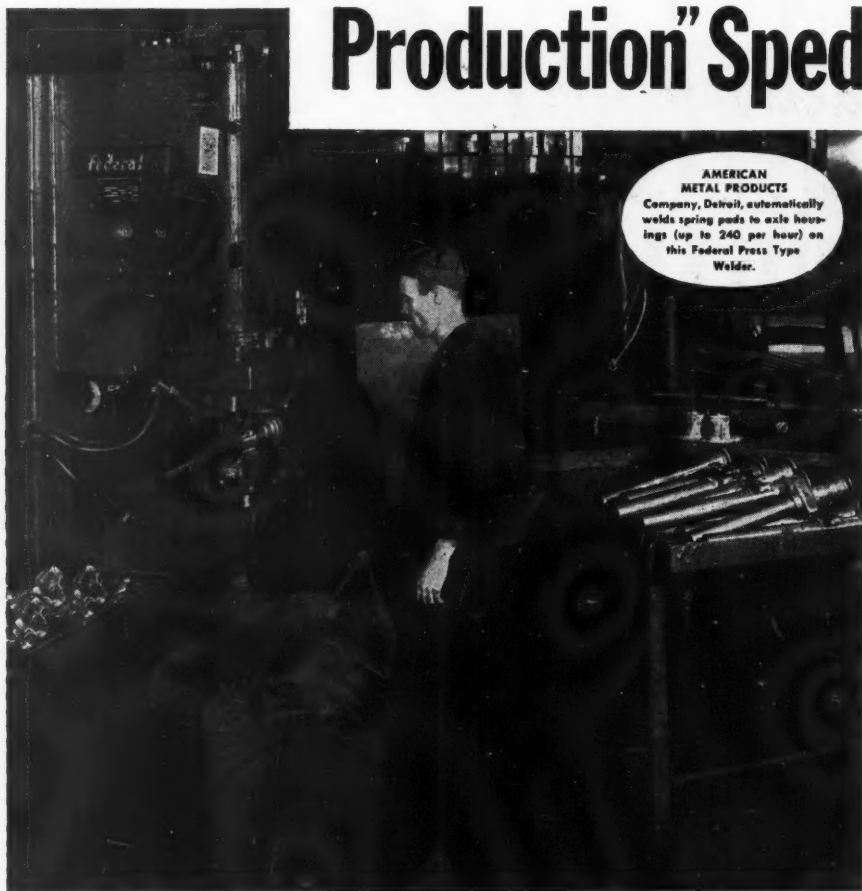
Write Today for BULLETIN GC-12 S

QUALITY MACHINES
PRODUCE
QUALITY MACHINES!

GENERAL
ENGINEERING & MFG. CO.
ST. LOUIS 4, MISSOURI

★
Manufacturers
of
PRECISION
MACHINERY
Since 1917

Auto Industry Has Many Production" Sped



AMERICAN
METAL PRODUCTS
Company, Detroit, automatically
welds spring pads to axle hous-
ings (up to 240 per hour) on
this Federal Press Type
Welder.

THE **Federal**

BULLETIN SP 346—Describing Federal
Spot, Flash, Projection, Seam and
"Gun" Welders is yours for the asking.

SUBSIDIARIES

Sommer and Adams Co. Cleveland—SPECIAL HIGH PRECISION MACHINES
The Warren City Mfg. Co. Warren—WARCO PRESSES and PRESS BRAKES

MACHINE

Examples of "Necessities by *Federal* RESISTANCE WELDERS

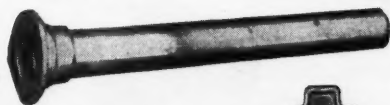
For instance, you can take a heavy-gauge steel tube like this, → which is a rear axle housing component, and a heavy gauge stamping like this, → which is a spring pad; insert them in a Federal PA-4 Press Type Welder with simple dies (shown left) and they come out as though one piece of metal . . . but stronger. Fifteen seconds total time. That's four pieces a minute.

Note the three nubs projecting inwardly on each side of the saddle portion of the stamping. At these points of contact between stamping and tube, welds initiate. Under heat and pressure the parts are forged together in these areas, the junctures becoming stronger than surrounding parent metal.

To the vast saving of time, against previous joining methods, add time savings on final assemblies and great economy in material resulting from this design. (Heavy castings were used where lighter but tougher stampings now do the job). There you find the reasons why industries noted for making the most of needed goods at the lowest cost are largest users of Federal Resistance Welders.

This is typical of hundreds of Federal welded jobs produced by the American Metal Products Company of Detroit, makers of quality parts for many industries. It is typical too, of thousands of other production-speeding, cost cutting methods possible with Federal Resistance Welders.

Every delay of full-scale production for the dammed-up needs of world markets through shortages of material or of work makes the need for eventual production speed more important . . . lowering of unit costs more urgent. When you find out (through the Federal Engineering Service nearest you) how you can cut cost and time in YOUR production with automatic welding, be sure that you get Resistance Welders by . . . *Federal*



APPLIANCES



RADIO PARTS



ACCESSORIES



UTENSILS



PRODUCTION
SHORT CUTS

PROJECTION WELDED
Thousands of variations of the typical items above are produced at low cost on Federal Welders described in Bulletin 4520

AND WELDER COMPANY

218 DANA STREET

WARREN, OHIO



July, 1946

MODERN MACHINE SHOP 57

Long-Life ACCURACY

Marveco Live Center—designed and constructed for long wear and unusual capacity. Automatic takeup compensates for wear, guaranteeing Long Life Accuracy.

Send us your
CENTER PROBLEMS



THE LIVE CENTER



WITH A GUARANTEE

Send today for Free Catalog "THE MARVELS OF MARVECO"

MARVEL TOOL & MACHINE COMPANY

10979 W. JEFFERSON AVE. RIVER ROUGE 18, MICHIGAN

YOU'LL APPRECIATE THIS KIND OF "PRICE CONTROL"



control in the world is free and fair competition based on production with modern tools — efficiently applied.

The specialty of Sommer and Adams for more than a quarter of a century has been designing and building special purpose machinery—mostly aimed at doing something no other machine will do, all aimed at cutting time and cost in production. S and A creations range all the way from two-story fully automatic multi-operation machines to smaller ones like the Cleveland Vertical Milling Machine, at left.

This is a rigid, high-speed unit embodying all of the features essential to modern milling practices. Popular demand has made it a standard item which thousands of tool and die makers, and production plants find a practical necessity.

Ten chances to one there's a spot for one of these productive machine tools in your shop.

It is probable, too, that we have the answer to some particular production problems hampering YOUR cost control.

Let us send an S and A engineer to discuss it with you.



THE

SOMMER & ADAMS

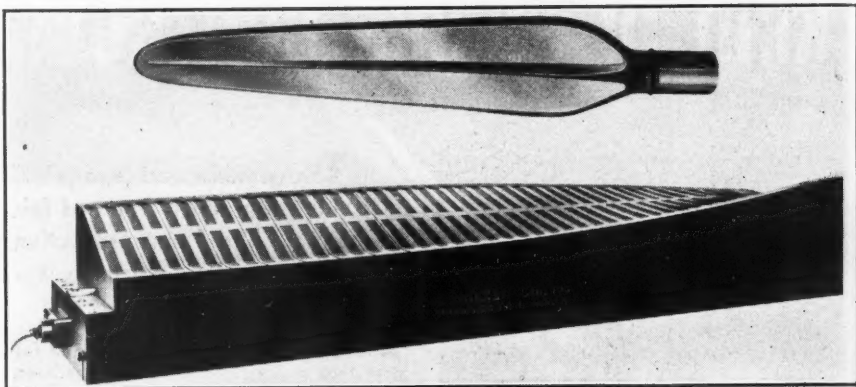
COMPANY

18519 EUCLID AVENUE • CLEVELAND 12, OHIO

Custom-Built EQUIPMENT FOR MANY PURPOSES

SUBSIDIARY OF THE FEDERAL MACHINE AND WELDER COMPANY

WALKER CHUCKS



This Chuck showing sectional Auxiliary Top Plates, interchangeable, used for holding magnetically, aeroplane propellers, for planing and milling operations.

Resulting in substantial reduction in cost.

Another example where Walker Engineering and Design has contributed to lower cost and increased production.

WALKER'S appreciate their obligation to the Metal Industry in solving and anticipating customer requirements.

WALKER engineers with over a half century of background and experience are qualified to offer solutions to magnetic problems.

WALKER chucks are universally used throughout the world.

WALKER engineers are constantly developing new magnetic chuck applications.

Walker invites you to submit your problems for their solution at no obligation.

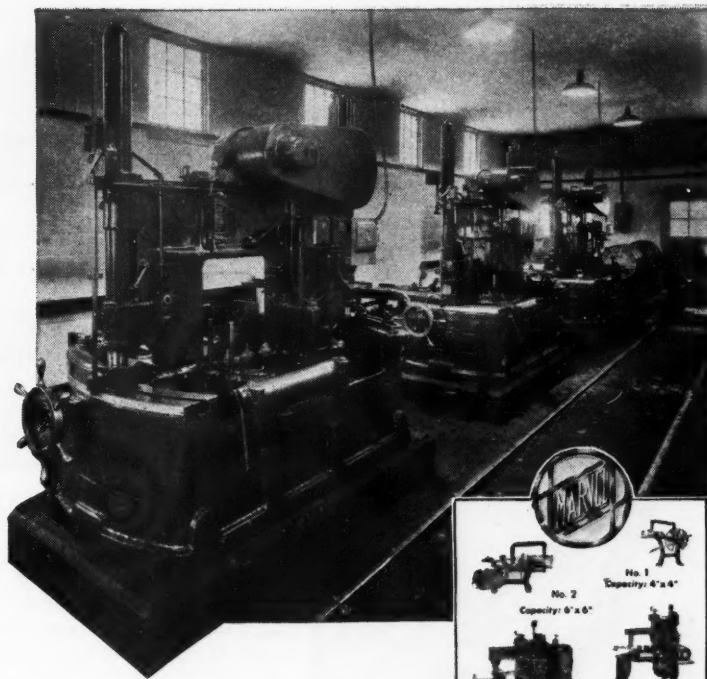
Walker Chucks

O. S. WALKER COMPANY
INCORPORATED

ORIGINAL DESIGNERS AND BUILDERS OF MAGNETIC CHUCKS

MAGNETIC CHUCKS • GRINDING MACHINES

WORCESTER 6, MASSACHUSETTS



EASILY CUT-OFF TOUGHEST STEEL

Steels just don't come too tough for MARVEL Giant Hydraulic Hack Saws. Take, for example, the three No. 18 MARVEL Saws, at the Babcock & Wilcox steel mill, shown above. These machines are used to cut test specimens for sample pieces of stainless and other tough alloy billets which are checked for seams, pipes, etc., before being drawn into tubing. It takes tough steel to make the best tubing, and it takes modern sawing equipment to cut it rapidly, accurately and economically. With 10 types of metal-cutting saws, each available in a series of variations, MARVEL can furnish sawing machines that exactly meet your requirements. If you have a metal-sawing problem—call in the local MARVEL Sawing Engineer.

Write for MARVEL Catalog or check it in your
Sweet's Catalog Files.

ARMSTRONG-BLUM MFG. CO.

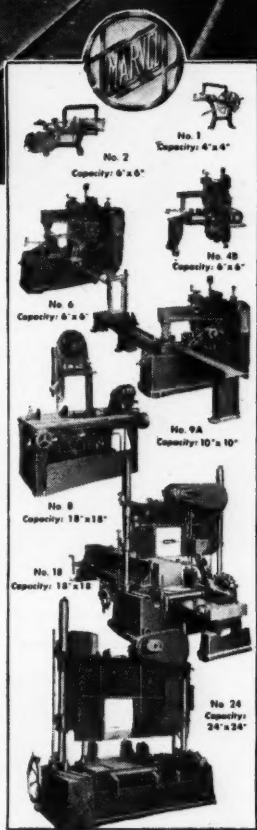
"The Hack Saw People"

5700 BLOOMINGDALE AVENUE

CHICAGO 39, U. S. A.

Eastern Sales Office:

225 Lafayette St., New York 12, N. Y.





**35TH ANNIVERSARY YEAR
1911-1946**

Midwest

**INSERTED BLADE CUTTING TOOLS
are Engineered to Cut Costs by
Combining Operations**

USING inefficient, only partially applicable tools on a production job, represents a continuing manufacturing loss—a loss that carries beyond a judicious investment in tools designed for the job.

Midwest Inserted Blade Metal Cutting Tools engineered at Midwest to assure fast, accurate work and fine finish, and combining otherwise separate operations, will reduce your manufacturing costs as they have in a wide variety of concrete instances.

Let us study your particular metal cutting problem and provide suggestions. Efficient tooling means profitable production. Write us today.

If you wish a copy of
this bulletin, write us on
your company letterhead

**Hy-Pressure Lock
Inserted Blade
Cutter Bulletin 1144**



Midwest Tool

**CARBIDE TIPPED TOOLS • MILLING CUTTERS • FORM TOOLS
COUNTERBORES • EXPANSION REAMERS • RECESSING TOOLS
CORE DRILLS • SLAVES • ADJUSTABLE HOLDERS**

**MIDWEST TOOL & MFG. CO.
W. JEFFERSON AVE., DETROIT 16, MICH.**

Makers of Fine Tools Since Nineteen Eleven

**Practical help for prospective buyers of
U. S. GOVERNMENT "SURPLUS"
NEW BRITAIN AUTOMATICS
SCREW MACHINES
CHUCKING MACHINES**

• • •

As government owned plants are declared surplus, large batteries of machine tools are becoming available to the public. Among these are NEW BRITAINS with many remaining years of useful productivity. If you are interested in acquiring any of these, contact our nearest representative or our home office.

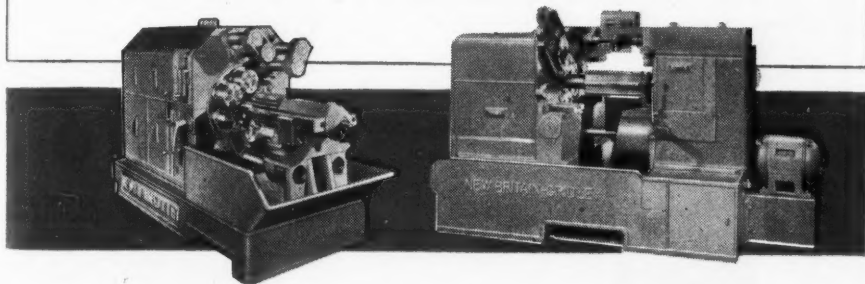
As an approved dealer for the War Assets Corporation, we stand ready to help prospective buyers of NEW BRITAIN Automatic Screw Machines and NEW BRITAIN Automatic Chucking Machines, to the end that maximum satisfaction is realized from such purchases.

A qualified New Britain representative will work

with you in locating the type of machine desired, join you in an inspection and advise you insofar as possible as to its condition and suitability for your needs.

With identifying serial number, our home office can advise as to equipment originally shipped with the machine, and furnish you engineering assistance in adapting it to your work . . . At the same time, we can advise as to cost of any necessary equipment needed to meet your requirements.

Consult our nearest field representative or our home office for further details.



NEW BRITAIN AUTOMATICS

**THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT
NEW BRITAIN-GRIDLEY MACHINE DIVISION**

M-01036-B

TOOLS
TOOLS
S

en

TEX-DRIVE

Disc and Combination GRINDERS

A Versatile Team for Many Grinding Jobs

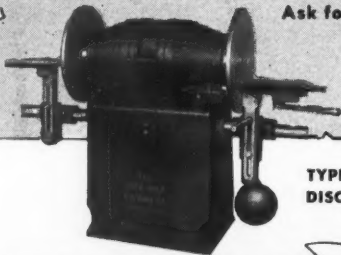
Adaptable to a variety of flat grinding jobs, the Tex-Drive Disc and Combination Grinders are ideally suited for the average shop.

The Type DF Combination Disc Grinders are designed for the shop with a limited amount of flat grinding as they permit tool and snagging grinding as well. They are available in 2 to 10 H. P. motor drive.

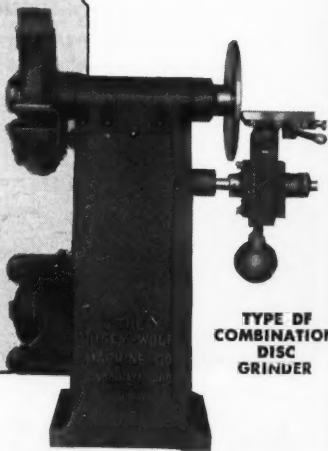
The Type D Disc Grinders with disc grinders on each end of the machine are equipped to do a large variety of flat grinding jobs and are available in 2 to 10 H. P. motor drive.

Write now for full information on these versatile machines.

Ask for Catalog 70-W.



TYPE D
DISC GRINDER



TYPE DF
COMBINATION
DISC
GRINDER

Hisey

1896 ★ 1946

THE HISEY-WOLF MACHINE CO.
CINCINNATI, OHIO

KEMPSMITH ALL-GEARED

DRIVE
for POSITIVE POWER
and SMOOTH MILLING

*It's
Chatter Free!*



Precision Anti-friction Bearings
Used for Spindle Mountings
and All Gear Mountings . . .

57 Years of specialized Experience
Building Milling Machines and Attachments Exclusively.

For sheer ruggedness and power, you just can't beat a KEMPSMITH Milling Machine. That's because it's engineered and built for the really tough jobs. For example, KEMPSMITH has combined all-geared transmission, precision anti-friction bearing mountings and automatic splash lubrication to attain maximum transmission of positive power . . . chatter-proof smoothness in cutting . . . and long life accuracy. 13 gears permit a selection of 18 speeds and 18 feeds . . . yet there are never more than three gear contacts between clutch and cutter. The large precision-built spindle gear is always in mesh when the machine is taking heavy loads. This assures smooth, chatter-free milling, even with large diameter cutters. Consider a new, rugged KEMPSMITH the next time you need milling equipment.

Write today for literature.

The KEMPSMITH MACHINE CO., Milwaukee 14, Wis., U.S.A.
Precision Built Milling Machines Since 1888

if it takes you more than

28 minutes to pierce this one panel...

then you'd better get a **WIEDEMANN**



The same short run piercing job took 28 minutes on a Wiedemann R-4P because layout time was completely eliminated. There was no waiting for the die set-up man . . . all punches and dies were carried in the turret of the machine right at the operator's fingertips.

There's a Wiedemann Turret Punch Press that can save you both time and money on every short run piercing operation . . . chassis, instrument panels, electrical boxes, bus bars, sheet metal parts, and plate up to $\frac{3}{8}$ " in thickness.

Get the facts today. Send for the story of short run piercing economy . . . Bulletin 92.

WIEDEMANN MACHINE CO.
1821 SEDGLEY AVE. • PHILADELPHIA 32, PA.


HERE'S THE ACTUAL JOB!

Check these production times . . . typical work of the R-4P.

- * 42 strokes required to complete job
- * 8 different dies required - R-4P Pin Type Gauge
- * Total time to produce first piece . . . 28 minutes
- * Time for every subsequent piece . . . 9½ mins.



MICHIGAN  designed and built
the tools for these parts

and
MICHIGAN  used the tools
to machine and broach
this complete product

Two "KNOW HOWS"

Broaching tools are not only designed and built at MICHIGAN—they are also used!

This builds the kind of experience and complete "Know How" that you want when selecting a source for tools or for machining and broaching production parts.

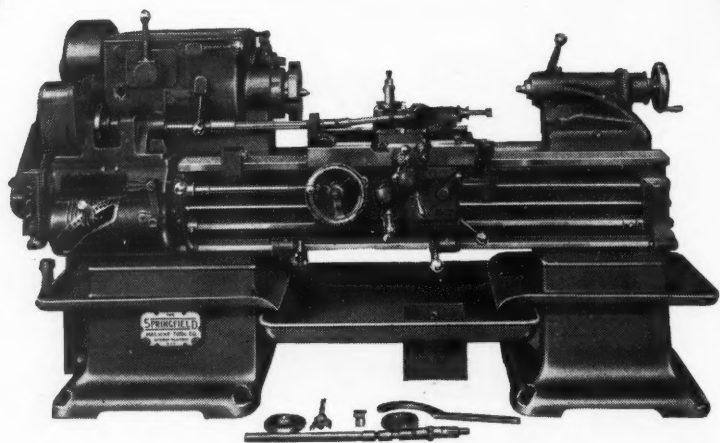


Let us analyze your production parts. Any job we accept is done with
"undivided responsibility."

MICHIGAN  BROACH CO.

10368 NORTHLAWN AVE. • DETROIT 4, MICH.

PRECISION and LONG LIFE



SPRINGFIELD Precision LATHES fill the demands for tool room and production work by providing (1) extreme accuracy and (2) maintenance of this accuracy and long life.

Here are some of the factors that account for the sustaining of the original accuracy built into each Springfield Lathe:

HEADSTOCK . . . 12 speeds . . . only half of the easy-shifting spur gears mesh at one time. APRON . . . extra heavy . . . operates on ball and bronze bearings throughout. TAIL-STOCK . . . all bearings and bed ways oiled from one well.

The SPRINGFIELD LATHE is an outstanding value for both tool room and quantity production use. Write for Bulletin 162.

THE SPRINGFIELD MACHINE TOOL CO.

SPRINGFIELD

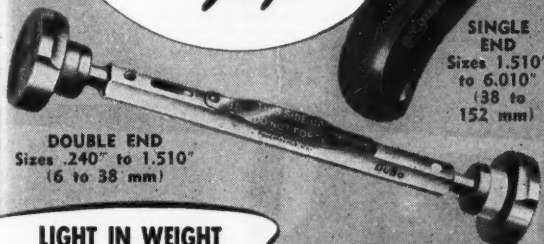
OHIO

THE BETTER PLUG GAGE



STANDARD

DuBo *
Gage

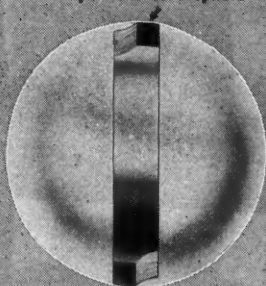


DOUBLE END
Sizes .240" to 1.510"
(6 to 38 mm)



**SINGLE
END**
Sizes 1.510"
to 6.010"
(38 to
152 mm)

Gaging Surfaces are
portions of a sphere



Gaging Surface

LIGHT IN WEIGHT



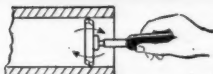
DuBo Gages over 1" diameter weigh 70% to 80% less than corresponding AGD cylindrical plug gages. Their lightness gives greater ease in handling, resulting in less strain on the operator, fewer errors due to fatigue.

EASY TO ENTER



DuBo requires no jockeying to enter, even into undersize bores. Inserted with the handle tipped slightly above the bore axis, it enters easily, more easily than even a piloted cylindrical plug gage. This means time saved.

DEFINITE CHECK



The check is made by lowering the handle gently, bringing gaging surfaces in contact with bore walls. Whether or not handle will drop freely below bore axis is the definite, yes-or-no answer even if part is close to limit.

**DuBo Gages
can detect
out-of-roundness
and taper whether
enlarging toward
or away from
the opening!**

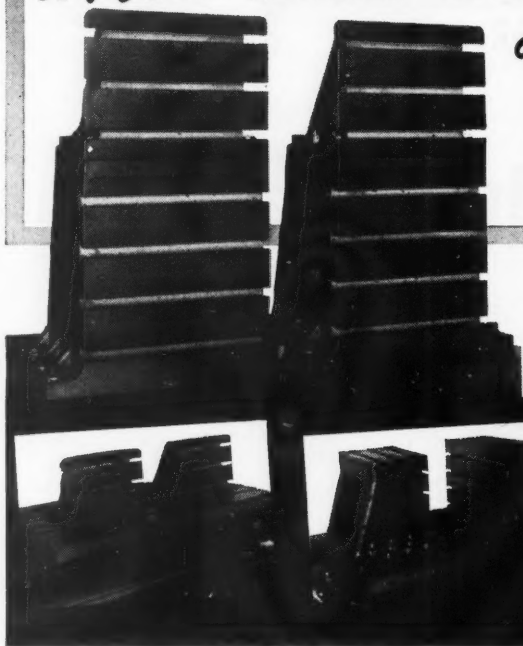
*Patents Pending

IT ALL ADDS UP TO
PRODUCT IMPROVEMENT
along with COST SAVING

Write for Bulletin

STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.

A *New* HIGH IN A COMBINATION of MATCHED *Angle* BLOCKS!

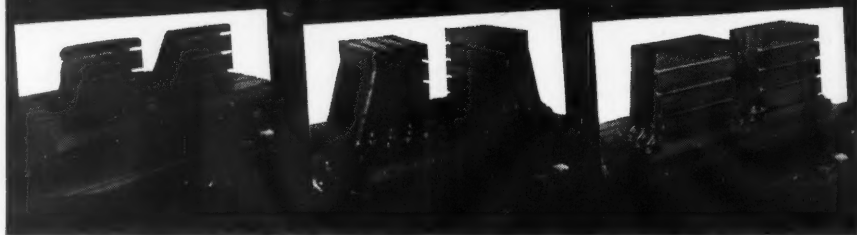


TOP MEMBERS—Vertical Face—12" High, 16" Wide—3 Tee Slots.

BOTTOM MEMBERS—Vertical Face—18½" High, 16" Wide—4 Tee Slots.

TOP FACE—12" Deep, 16" Wide—3 Tee Slots.

TEE SLOTS—13/16" Wide, 4" Centers.



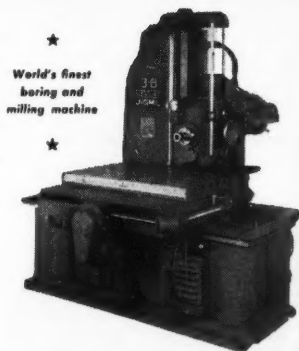
THIS combination of matched units serves convenience and rigidity for accurately locating and chucking work when boring, milling, planing or for other toolroom and general use. They can be used singly or in variety of combinations for large or small work.

They are machined from box section castings, with Tee slots and flat surfaces in precise alignment.

They are made with the same tooling and quality as the JIGMIL table.

Each set includes Tee slot nuts, studs and screws.

Write for price and delivery!



★
World's finest
boring and
milling machine
★

DEVLIEG MACHINE COMPANY

DEVLIEG
JIGMIL

450 FAIR AVE. FERNDALE 20,
(Detroit) MICH.



MANHATTAN

Abrasive Wheels

Designed by competent engineers to give you the lowest cost per pound on metal removed or number of pieces ground where Rubber Bond or Resin Bond is adaptable to the job. Complete range of sizes for swing frames, floor stands and portable grinders operating at high speed. For weld grinding topped by work on stainless. Low speed semi-polishing wheels to prepare the weld for final blend polish. And do not forget Manhattan for centerless grinding.

Write Abrasive Wheel Department

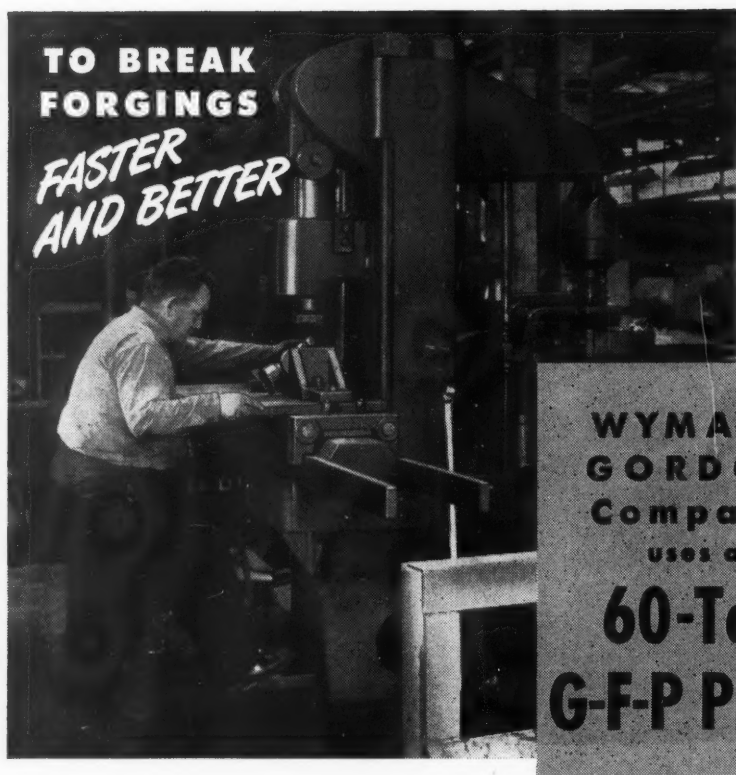


RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION

EXECUTIVE OFFICES AND FACTORIES

PASSAIC, NEW JERSEY



**TO BREAK
FORGINGS**

***FASTER
AND BETTER***

**WYMAN-
GORDON
Company**

USOI a

**60-Ton
G-F-P Press**

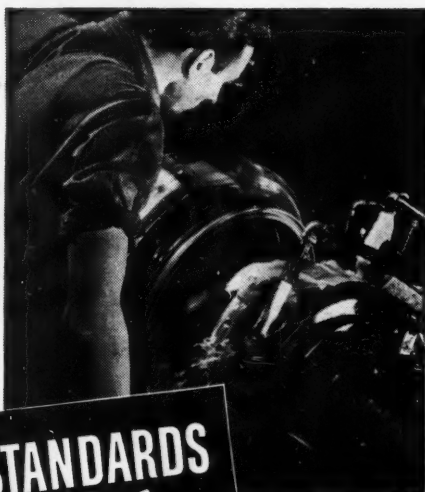
At the Wyman-Gordon Plant, Worcester, Massachusetts, test prolongations on critical Spider Forgings are fractured by a 60-ton capacity General Flexible Power Press. Fracture examination discloses forging quality. The G-F-P Press does the work faster—puts fewer shear lines on the fracture. G-F-P Presses—capacity 3 tons to 60 tons—provide quicker, easier, more economical straightening, bending, pressing, broaching, etc. Pressure and stroke length controlled by single foot pedal. Write for Bulletin No. 372.

General MANUFACTURING CO.

6436 FARNSWORTH AVE. • DETROIT 11, MICHIGAN

Costs Count

 IN THE AUTOMOTIVE
 INDUSTRY! -80



CARBOLOY STANDARDS
 CEMENTED CARBIDE

get the call!



Style T-15

Style T-12

Style T-1

Style T-4
(Style T-7,
left hand)

Style T-13
(Style T-14,
left hand)

Style T-5
(Style T-9,
left hand)

Style T-10
(Style T-11,
left hand)

Carboloy Tools Stay On the Job Longer in Continuous Production—Hold Close Tolerances—Produce Top-Quality Finish

They watch costs with an "eagle-eye" in the highly competitive automotive industry. And that's why you'll find Carboloy Cemented Carbide "Standards" used in the production of virtually every mechanical part in the automobile. Carboloy "Standards" have earned this preference because of their superior stamina throughout long, continuous production runs—their high piece-output-per-tool—their ability to hold close tolerances,

maintain their cutting edge longer between grinds, and produce the high quality finish required in today's motor cars.

In Every Industry, 60 to 80% of the Carbide Tool Needs Are Met By These 11 Standard Styles

Carboloy Standards are "master" styles, designed to handle most of your turning, facing and boring jobs. For special requirements, they may be quickly ground to the desired shape. They save stocking a large inventory of special tools, and let you tool up immediately on most jobs. Equally suitable for metals and non-metals. And actually priced lower than ordinary tools in many sizes. Write today for Catalog GT-175R.

CARBOLOY COMPANY, INC., 11143 E. 8 Mile Road, Detroit 32, Mich.
 Chicago • Cleveland • Detroit • Houston • Los Angeles • Milwaukee • Philadelphia • Pittsburgh • Thomaston

STOCKED BY



Standard **CARBOLOY TOOLS**
 (TRADEMARK) CEMENTED CARBIDE

QUICK MARKING FOR PART NUMBERS!

MODEL
175
HYDRAULIC



MARKING
BY ROLLING
IS ~~FAST~~-
ECONOMICAL



This Hydraulic Marking Machine speeds marking operations to reduce costs. It will mark flat surfaces and peripheries when equipped with proper accessories. Setup time is reduced materially in this Hydraulic Machine since depth of marking is controlled by a simple hand valve.

Part thickness or diameter variations up to $\frac{1}{4}$ " will carry uniform marking depth without change in table setting.

Die Slide Travel . . . 6"

Send prints of parts, showing required marking and its location on the part with required hourly production for recommendation and quotation.

Designed and Built by



GEO. T. SCHMIDT, INC.

**1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS**



ROCKFORD
Hy-Draulic
MACHINE TOOLS

Over sixteen years ago the Rockford Machine Tool Co. introduced the first hydraulic reciprocating machine tool. Today our belief in the superiority of hydraulic design stands justified, for Rockford Hy-Draulic Machine Tools have proved themselves wherever and however employed. The exclusive and highly specialized engineering experience that has been ours is fully applied in each machine tool we build.

Every Rockford Hy-Draulic Machine Tool offers such important fundamental advantages as:

1. Ease of control for quick set-up and fast operation.
2. Stepless Speeds . . . infinitely adjustable throughout a wide specified range. Hy-Draulic tool-head feeds similarly adjustable.
3. Efficient, smooth hydraulic pressure . . . maintains cutting speed as set, no matter how work resistances may vary.
4. Smooth, fast reversals and high return-stroke ratios. Oil flow through Hy-Draulic System is instantly reversible. Simplicity of Hy-Draulic System holds inertia factors to a minimum.
5. Fine finish and long tool life. Smoothness of Hy-Draulic drive, free of mechanical play and vibration, protects work and cutter.

Rockford Hy-Draulic Machine Tools assure quality work with speed at minimum cost. Let the Rockford sales engineer give you complete information.

4606

low bridge

With the cross rail snuggling the top brace, this Rockford 48"x48" Hy-Draulic Double-Housing Planer is handling a 46" high, five ton casting with speed, ease and accuracy. On the particular job shown, set-ups require stroke lengths of as little as 8", with the tool heads feeding across the entire width of the casting. Hy-Draulic drive can take work like that in stride without sacrifice of speed in either cutting stroke or reversal. Rigidity of Rockford Planer construction is also demonstrated here; work is smooth and accurate although the cross rail is raised to near-top position.

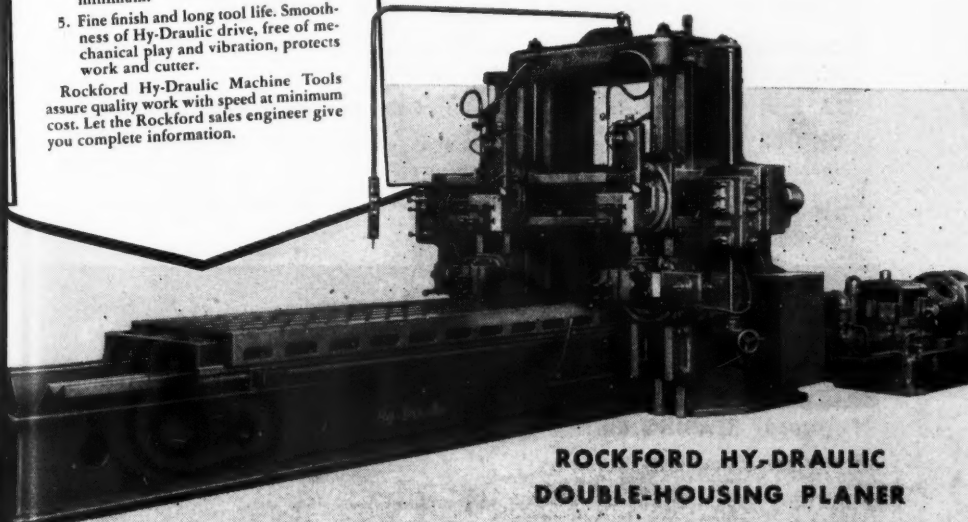
Rockford Hy-Draulic Double-Housing Planers are built in four standard sizes, from 36"x36" to 60"x60", each size is available in six maximum stroke-length ratings ranging from 10 feet to 20 feet. You are invited to write for complete information on these machines. Ask for Bulletin 1634

ROCKFORD MACHINE TOOL CO.

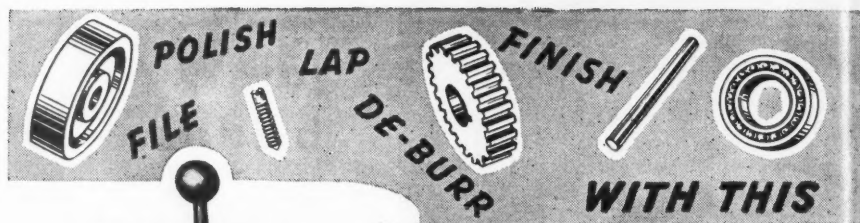
ROCKFORD, ILLINOIS



SHAPERS-PLANERS-SLITTERS-SHAPER-PLANERS



**ROCKFORD HY-DRAULIC
DOUBLE-HOUSING PLANER**



New LIGHT DUTY MULTI-PURPOSE SPEED LATHE

"The easiest operating Speed Lathe ever made!"
This small, light-duty Speed Lathe incorporates all of the high-quality construction features of the larger, heavier Speed Lathes . . . plus

3 Exclusive Operating Features

CONVENIENCE of Operation: Hand operating lever may be set on right or left hand side, and in either vertical or horizontal position.

EASE of Operation: It requires less than 5 lbs. pressure to open the collet.

CHOICE of Operating Sequence: Simple adjustment of two screws gives the operator a choice of two operating sequences.

For Details and Specifications write for Circular 453.



SCHAUER MACHINE CO.



ORIGINATORS OF TODAY'S
SPEED LATHES

2060 READING RD.

CINCINNATI 2, OHIO

COUNT 10

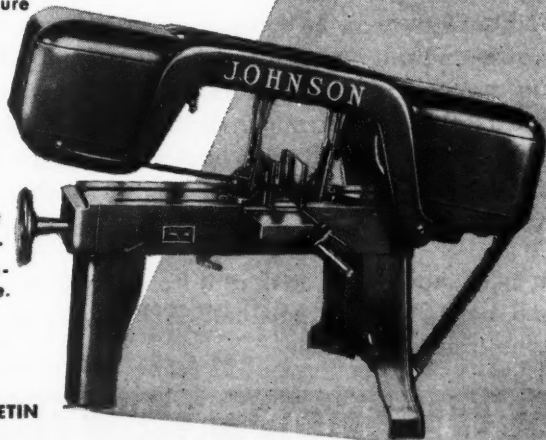
for a Sure bet in Bandsaws

Here are ten main features to help you judge how well the Johnson bandsaw can serve you . . .

- 1. Large Capacity:** 10" High x 18" Wide. Cuts small and large diameter stock — smoothly, evenly.
- 2. Three Point Base:** Firm anchorage always assured. Bed cannot absorb strains caused by uneven floors. Twistproof.
- 3. Rigid Box-Type Frame:** No wearing through friction. Oversize bearings and shafts throughout. Blade tension is uniform. Guides are wide — stay adjusted.
- 4. Bed is Wide and Deep:** Accurately machined — all component parts work from common machined surface. Upper frame moves on large pivot bar through bed.
- 5. Quick Acting Vise:** A time saver — takes a moment to lock workpiece in place.
- 6. Hydraulically Controlled:** Frame descends gently on oil cushion. Hydraulically stopped at any height.
- 7. Four Speeds:** 35, 90, 130, 190 feet per minute. You are sure of the correct speed for best results and fastest production.
- 8. Centralized Controls:** No needless steps — all operated from front of machine.
- 9. Long Blade:** 11' 5" long. Never heats. Most economical length to buy.
- 10. Portable:** Self-contained. Plug in anywhere. Casters available.

**WET ATTACHMENT
AVAILABLE.**

WRITE TODAY FOR BULLETIN



JOHNSON MANUFACTURING CORP.

5002 Chrysler Bldg.

New York 17, N. Y.

July, 1946

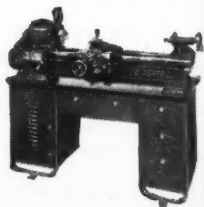
MODERN MACHINE SHOP 77



Get all the angles..
..on Lathes

Point-of-view can be more than an opinion, just as the piano expert crawls under a piano to check the number of plies in its case, the bracing and construction, just so "trick" angles reveal the true value built into a lathe—the bracing of the bed, whether the apron has a full double wall, a half backwall or no backwall, the type and size of back gears, ways, the size and finish of the spindle, etc., etc.

In selecting a lathe, look at it from any angle . . . and, before you buy, see the SHELDON, it's a good lathe from any angle.

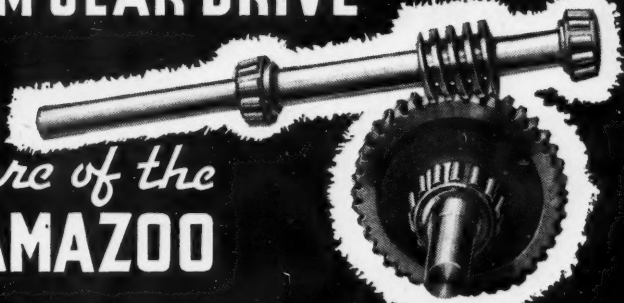


SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Arbor Presses • Vises
 Sheldon Vernon Horizontal Milling Machines • Vertical Milling Machines and Jig Boreers • Shapers
 4250 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

Totally Enclosed WORM GEAR DRIVE

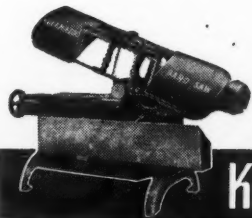
a
feature of the
KALAMAZOO



The worm drive costs more, but is used exclusively on the Kalamazoo because it operates more smoothly and with a minimum of wear.

This worm gear runs silently in a bath of oil, completely housed against chips or foreign matter. Note too, that Timken Bearings are used on both drive shaft and gear shaft. Years of trouble-free service is assured for this drive mechanism.

Ask your dealer or write direct for complete information.

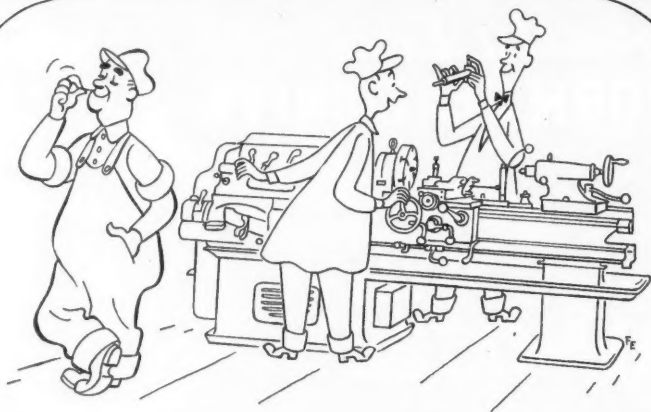


MACHINE TOOL DIVISION

KALAMAZOO TANK & SILO CO. • Kalamazoo 16, Mich.

In Canada—Bridge Machinery Co., Montreal

Kalamazoo Metal Cutting Band Saw



The Story of the Bull with the Greenhorns

Once upon a time greenhorns got in the Old Bull's hair, but those trying times can be banished forever. Ask any Old Timer who has Hendey Precision Tool Room Lathes in his department. He'll tell you it's a pleasure to run them—they're easy to operate—they produce such fine work—they're ideal for training greenhorns.

There are sound reasons for this—reasons for which Hendey engineers and designers are responsible. Their forward thinking and functional designing—their particular attention to critical construction features combine to make Hendey Precision Tool Room Lathes simple to operate, absolutely chatter-free, exceptionally accurate, fast and economical producers.

You may not be the Old Bull in your shop, but if you are interested in speeding the training of greenhorns, plus improving tool room work and reducing costs, you should write to Hendey today.

The Hendey Machine Company

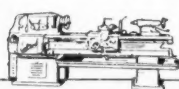
Main Office and Plant — Torrington, Connecticut

Branch Offices — New York, Chicago, Boston, Detroit, and Rochester
Representatives in — Phila., Cleveland, Los Angeles, Pittsburgh, San Francisco

Hendey

TOOL ROOM LATHES

12" - 14" - 16" - 18" - 20" - 24"



SHAPERS

12" - 16" - 20"

**HERE'S THE PORTABLE SAW
THAT SAVES TIME AND
LABOR ON CUT-OFF JOBS**

... a handy tool for you



Wells No. 8

Specifications

CAPACITY: Rectangular	8' x 16"
(Special Guides)	5' x 24"
ROUNDS:	8" Diameter
MOTOR:	1/2 H. P., A. C. or D. C.
SPEEDS:	Selective 60, 90, 130 feet per min.
WEIGHT:	Approximately 665 pounds

All around the plant you'll see them—stock room, tool room, machine shop, maintenance dept.—wherever there is cutting to be done. Write for bulletin—or ask for a representative to call and give you the details on the low-cost Wells.

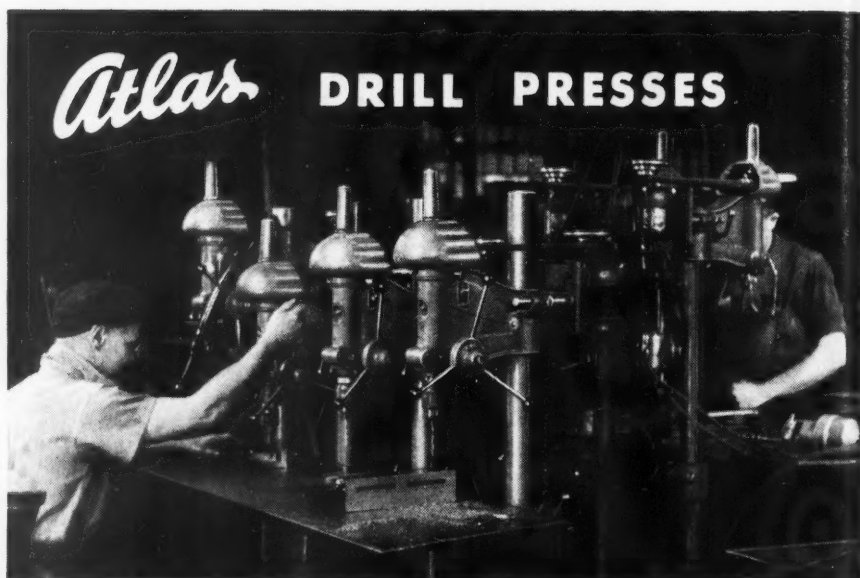
Wells SAWS
THE WAY TO EFFICIENCY

Wells

Products by Wells are Practical

**METAL CUTTING
BAND SAWS**

**WELLS MANUFACTURING CORPORATION
808 TYLER STREET, THREE RIVERS, MICH.**



Atlas DRILL PRESSES

Soundly Engineered to Cut Machine Hour Costs

More and more production men are beating rising material and man-hour costs on small-parts operations by installing compact Atlas tools.

The Atlas 15" drill press—with its lower investment and lower operating cost—will trim expenses on the full range of small-hole drilling and tapping operations.

Atlas' unique "Floating Drive" spindle head, with 4 SKF ball bearings—soundly housed and supported with heavy well-braced castings—assures smooth, high-speed precision operation.

There are 9 speeds between 600 and

5200 RPM. Jacobs Chuck—capacity $\frac{1}{2}$ "—standard equipment. The 10" x 10" table is fully tilting, travels 12" vertically on the bench model and 40½" on the floor model. Motor recommended, $\frac{1}{3}$ or $\frac{1}{2}$ HP. By adding air chucks, cut-off switches and other special production aids, many plants secure amazingly high output from a small equipment investment.

Ask your Atlas distributor for full details. Send for latest catalog.

ATLAS PRESS COMPANY

746 N. Pitcher St.

KALAMAZOO 13D • MICHIGAN



4

Atlas TOOL TEAM
FOR
SMALL-PARTS MACHINING

1.2.3.4.

LATHESMILLING MACHINESSHAPERSDRILL PRESSES

Increase Shop Capacity and Efficiency

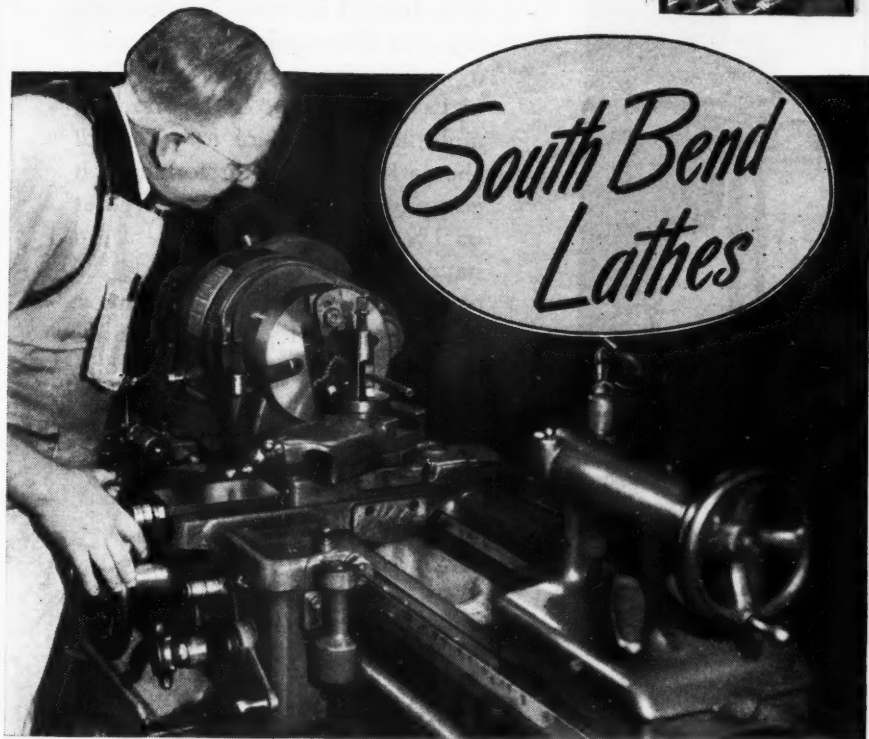
Increase shop efficiency and you increase production capacity. Work moves smoothly, swiftly, surely, and in greater volume, through the efficient shop. Modern, efficient, precision machine tools are one of the first essentials for maximum efficiency.

Famous for versatility, South Bend Precision Lathes bring peak efficiency to shops where frequent changes of set-up are called for and a variety of materials are used. And their modern design, with convenient controls and full quick change gear equipment, means less fatigue and less "machine scrap" due to such causes.

If your shop problem is to increase efficiency, it will pay to consider the installation of South Bend Precision Lathes when new equipment is added, or present equipment is replaced.

Send For Catalog

Catalog 100-D shows in color all sizes and models of South Bend Toolroom, Turret, and Engine Lathes. Made in 9", 10", 13", 14-1/2", and 16" swings. Accessories and attachments shown.

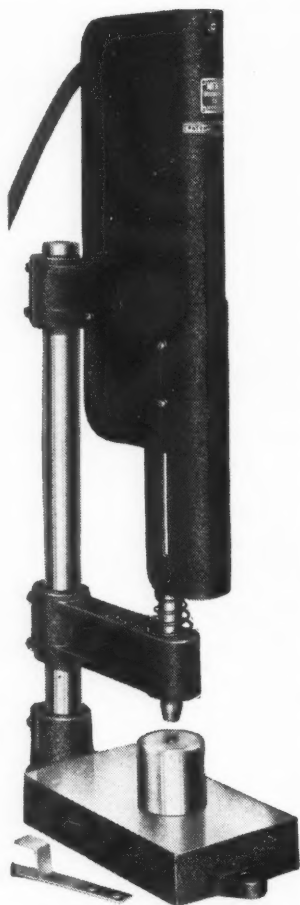


LATHE BUILDERS SINCE 1906



SOUTH BEND LATHE WORKS
427 EAST MADISON STREET • SOUTH BEND 22, INDIANA

Announcing the **MEAD**
Impact **AIR**
HAMMER



Ready . . . Mead's new air-powered Impact Hammer . . . weighing only 27 pounds . . . yet having a wallop like a pile-driver! One of its outstanding applications is multiple piercing of large metal sheets before or after forming. It can punch holes as close together as $1\frac{3}{4}$ " on centers. Value of the impact readily adjusted from 4,500 pounds down to only a few ounces. Set-ups are quick, easy. Besides innumerable punching operations, with suitable attachments it is capable of upsetting rivets, blanking out soft materials with knife dies, light coining, forging operations, etc. Get complete facts on this versatile, handy new tool and other Mead Air Power devices. Write for Catalog.



MEAD SPECIALTIES COMPANY

4114 NORTH KNOX

DEPT. AA-76

CHICAGO 41, ILL.

Get ALL the advantages of magnetic holding

Use Brown & Sharpe Permanent Magnet Chucks

COST NOTHING TO OPERATE ... EVEN TO INSTALL

- ★ No electricity, wires, electrical connections, generators or brushes.
- ★ Nothing to maintain. Special alloy magnets retain energy indefinitely.

SIMPLE MECHANICAL CONTROLS

- ★ Hand-operated. Easy 180° movement from ON to OFF position.
- ★ POSITIVE HOLDING
- ★ INSTANT RELEASE
- ★ plus wide variations of holding force for easy positioning of work.

SAFE FOR WORKMAN AND WORK

- ★ No danger of work flying off due to power interruption.
- ★ Work can be left on chuck indefinitely without danger of heating either chuck or work.

MORE USEFUL IN MORE PLACES

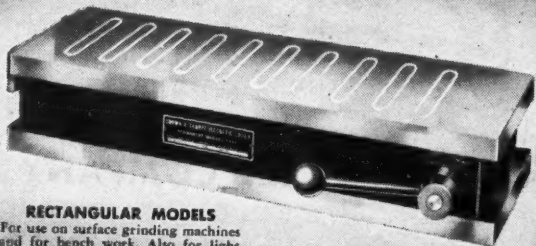
- ★ Portable... for use on various machines, also for testing, inspection and laying out work.
- ★ Wet or dry grinding.
- ★ Large, heavy work or groups of small parts.

★ These chucks are for sale only in the United States of America and its Territories.



ROTARY MODEL

for grinding operations and light cuts on lathes.



RECTANGULAR MODELS

For use on surface grinding machines and for bench work. Also for light cuts on planers, shapers and milling machines.

ALSO permanent magnet V blocks and dial test indicators with magnetic bases.

WRITE FOR CATALOG describing operating principles.

BROWN & SHARPE MFG. CO., Providence 1, R. I.

BROWN & SHARPE

**GAY-LEE
COMPANY**

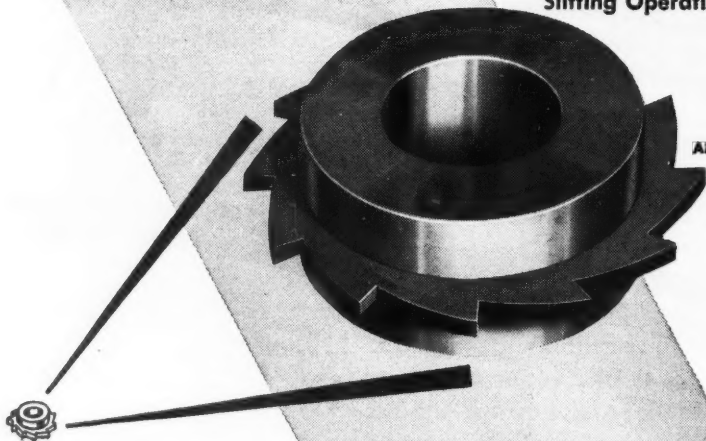
NOW—

CARBOLOY

Cemented Carbide
in Hub-Type

SLITTING SAWS

for Commutators and other
Slitting Operations



PATENT
APPLIED FOR

A steel hub, permanently joined to a Carboloy cemented saw blade, eliminates fracturing due to the strain imposed by mounting screws or nuts. That is one reason why Gay-Lee Commutator Slitting Saws give longer service. All teeth are generated to provide extra strength, to give maximum cuts per tooth. Cutters are slightly concave to insure proper clearance. For speed and accuracy in your undercutting and "U" slotting operations, specify Gay-Lee.

GAY-LEE COMPANY FERNDALE 20
MICHIGAN

In Milwaukee: H. E. Beck Company, 759 Milwaukee St. Phone: Doly 3899.

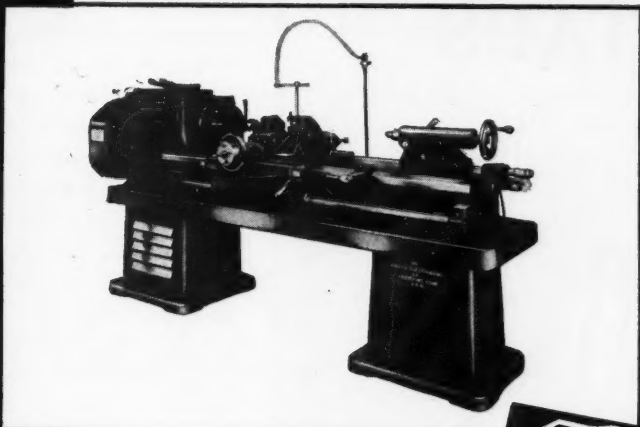
In Rochester, N. Y.: Production Tool Company, 82 St. Paul St. Phone: Main 4330.

In Chicago: Herbert G. Taylor & Associates, 5916 W. Division St. Phone: Columbus 0614.

In Toledo: George E. Sanderson, 663 Spitzer Building. Phone: Main 3939.

40 YEARS of EXPERIENCE

produced
the new **COULTER**
AUTOMATIC THREADING LATHE



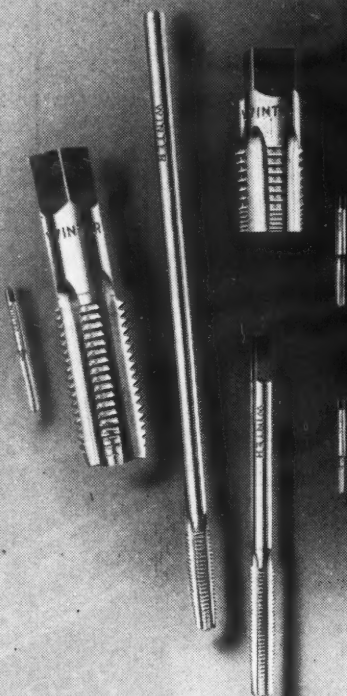
The many different and number of threading tools which can be arranged on the tool slides both front and rear, make this machine the most versatile of any for production of square, standard, and 29 degree threads, both internal and external.

Equipped with disc clutch . . . Easy to operate . . . Rigid Construction . . . Four speed headstock . . . Return or Idle travel speed has been increased five times cutting speed.

PRODUCTION MACHINES SINCE 1896
Write for full particulars

The James **COULTER** *Machine Co.*
BRIDGEPORT • CONNECTICUT • U. S. A.

WHY Your Production Set-up Should Include WINTER TAPS



FOR 45 years Winter Taps have been satisfying a need for precision threading tools in all branches of the metal working industry and more recently in the plastics field.

Production at lowest cost and Winter Taps are synonymous. Properly designed Taps, controlled manufacturing tolerances and scientifically treated high speed steels, are the culmination of Winter Brothers untiring research and constant laboratory testing, resulting in closer threading tolerances, cleaner threads, longer service between grinds and *extra tap life*.

You get more production at lowest tap cost from Winter Taps. Specify them — always!

• • •

For that troublesome tapping job, Winter Brothers "result getting" Service Engineers can prove highly valuable to you as a user of Winter Taps. Maintained to help you to more economical threading.

Winter Brothers

COMPANY  Wrentham, Massachusetts, U.S.A.
BRANCH STORES: SAN FRANCISCO, CALIFORNIA · CHICAGO, ILLINOIS · DETROIT, MICHIGAN
A DIVISION OF THE NATIONAL TWIST DRILL & TOOL CO., ROCHESTER, MICHIGAN

ONE SURE WAY TO TELL WHAT A BROACH IS WORTH

It's **SIMPLE, STRAIGHTFORWARD** and **FINAL**

BROACH COSTS = $\frac{\text{Price}}{\text{Number Acceptable Parts Broached}}$

It tells the whole story—leaves nothing to argue about—no recriminations.

Compare NALOY BROACHES in this way with any other tools you can buy or make—then standardize on what you find to be the lowest cost tool regardless of who makes it.

Industry has been using Red Ring Naloy Broaches in steadily increasing numbers for the past 15 years.



"Double Jump" Naloy pull broach and parts which show its cutting action.



Single spline Naloy pull broach.



Naloy spiral involute spline push broach.

NATIONAL BROACH AND MACHINE CO.

RED RING  PRODUCTS

3600 ST. JEAN, DETROIT 13, MICH.

SPECIALISTS ON SPUR AND HELICAL
INVOLUTE GEAR PRACTICE

ORIGINATORS OF ROTARY SHAVING AND
ELLIPTOID TOOTH FORMS

For Smoother Performance



USE ATLANTIC Contour Cutting BAND SAW BLADES

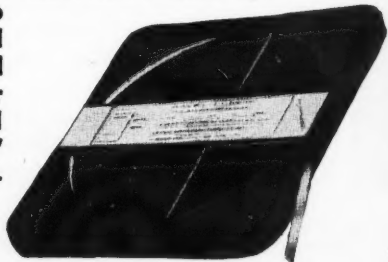
You will welcome Atlantic Band Saws in your shop. The teeth are set to permit a smoother performance for radius cutting. The special alloy steel insures longer wear and you can weld them easily.

IMPROVED PACKAGE

One of the strongest, most practical and convenient boxes on the market. Cutaway feature shows inventory at a glance.

Box is solid chipboard construction that won't come apart. Saw securely held in coil form, no bothersome wires to cut. Required lengths freely removable. Marked on end as well as top of box for easy identification. Packed in all widths $3/32''$ to $1/2''$ wide in 100' lengths. Number of teeth as permitted by W. P. B. ruling.

Send for Atlantic Band Saw Booklet



ATLANTIC SAW MFG. CO., Inc.

Manufacturers of Metal Cutting Band Saw Blades Exclusively
155 Brewery St., New Haven, Conn.



WHEN IS A MACHINE *"Washed Up"*?

In seven years some say—but in modern production practice it is not a question of years or how much the machine has earned or still owes you. The question is, will your equipment enable you to compete with the new, faster working, more efficient and flexible layouts in your competitors' plants.

A five-year-old Machine Tool is "washed up", for instance, if it can be replaced by one costing a few hundred dollars that will write itself off in less than a year through improved production. That's the story of Walker-Turner Machine Tools wherever metals, wood or plastics are drilled, cut or shaped.

These machines are "light" only in weight and price. Their production output in the past eight years has astounded the management of thousands of plants—large and small—throughout the country.

A key to high manufacturing efficiency and low manufacturing costs is the modern, flexible, light machine tool. It represents small capital investment, flexibility of operation, increased productivity and low operating costs.

Walker-Turner Machine Tools are sold only by authorized Industrial Machinery Distributors. A general catalog will be sent on request.

RADIAL DRILL

20" DRILL PRESS

RADIAL SAW

BAND SAW

TILTING ARBOR SAW

walker-turner
COMPANY, INC.
PLAINFIELD, N.J.
U.S.A.

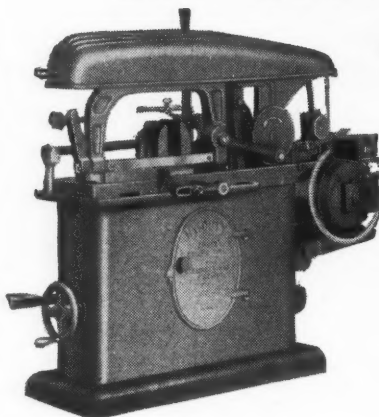
MACHINE TOOLS

DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS
 METAL CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
 RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & PULLEY SYSTEMS

KELLER

POWER HACK SAWS

CUT CUTTING COSTS



← **No. 3 HY-DUTY**
\$360 INCLUDING MOTOR
 F.O.B. FACTORY

SPECIFICATIONS:

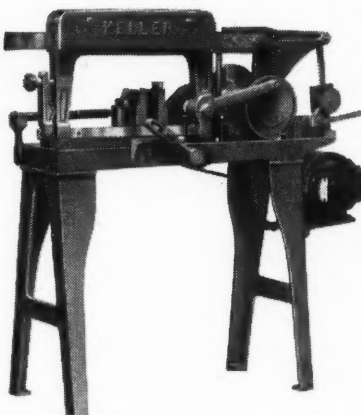
Capacity, $6\frac{1}{4} \times 6\frac{1}{4}$ inches.
 Vise swivels to 45 degrees.
 Capacity at 45 degrees, 4 inches.
 With automatic safety stop switch.
 With feed control.
 With foot lift to saw frame.
 Automatic lift on reverse stroke.
 With coolant tank and pump.
 Length of blade, 12 to 14 inches.
 Two speeds available, by shifting belts.
 100 to 168 strokes per minute.
 $\frac{1}{2}$ H.P., AC, 1,725 R.P.M. motor.
 Height from floor to top of vise, $22\frac{1}{2}$ inches.
 Weight complete with motor, 580 pounds.
 Weight complete crated, 634 pounds.
 Floor space, 13 x 27 inches. Length, 40 inches.

No. 3-B DRY CUT →
\$150 INCLUDING MOTOR
 F.O.B. FACTORY

SPECIFICATIONS:

Capacity, $6\frac{1}{4} \times 6\frac{1}{4}$ inches.
 Vise swivels to 45 degrees.
 Capacity at 45 degrees, 4 inches.
 With automatic stop, electric switch.
 Length of blade, 12 to 14 inches.
 Standard power blades used.
 Two speeds available, by shifting belts.
 70-125 strokes per minute.
 Automatic lift on reverse stroke.
 $\frac{1}{4}$ H.P., AC, 1,750 R.P.M. motor.
 Height from floor to top of vise, 25 inches.
 Weight complete with motor, 275 pounds.
 Weight complete crated, 325 pounds.
 Floor space, 13 x 27 inches.
 Total length, 40 inches.

Several Other Models Available



SEE YOUR LOCAL DEALER, OR WRITE DIRECT TO US.

SALES SERVICE MACHINE TOOL CO.

2426 UNIVERSITY AVE.

ST. PAUL 4, MINN.

Why does this TAP come in a CAPSULE?



Because only the best package is good enough for Threadwell High Speed, Ground Thread Taps.

If you could see the care and craftsmanship that goes into the grinding, finishing, hardening (including Threadwell's exclusive COLD-TEMPER process at 120° below zero), testing and inspection of these precision taps

- you'd understand why we put them in the Tap-Capsule — for complete, individual protection against dirt or careless handling, and for easy selection *before* unwrapping
- you'd appreciate why we've left no stone unturned to improve the convenience and utility of

these fine cutting tools — why we treat them with a special *grainless rust-proofing* that keeps them always clean, dry and shining, ready for instant service

- why they're the only taps that are "i-dot-ified", *red* dot on the shank for cut thread, *white* for commercial ground, *blue* for precision ground
- you'd realize why we spare no pains to provide the finest possible service on Threadwell Taps — *personal attention* service at the factory and through carefully selected distributors who know how to meet your individual taps requirements.

All Threadwell Taps and Tools are sold exclusively thru Mill Supply Distributors. Ask for Threadwell Tap-Capsuled Taps.

*"Distributors in
Leading Industrial Centers
Throughout the
United States and the World"*

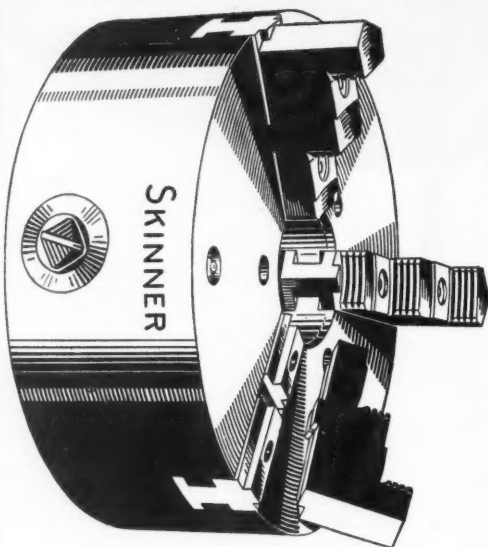


THREADWELL TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U.S.A.
CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

SKINNER

Chucks

MODELS, SIZES AND TYPES *for any machine
and every job...*



SERIES 3900 SELF-CENTERING
SCROLL CHUCK

Skinner 3-Jaw Self-Centering Scroll Chucks are made with the strength and accuracy required in modern production practice.

The Series 3900 illustrated has a forged steel body with heavy ribs to guide the jaws in their proper plane and is provided with Alomite fitting for lubrication of all moving parts.

All moving parts are made of suitable alloy steels properly heat treated for their respective functions. The jaw lands, steps and end bites are ground after assembly and tested to run within .003" total indicator reading.

Skinner self-centering chucks are made with either steel or semi-steel bodies and with 2-piece jaws or two sets of solid jaws. This type of chuck is furnished with flat back for threaded spindles or with taper seat backs for direct mounting on standardized taper spindle noses.

Write for new catalog No. 57 which gives complete information on all Skinner products.

THE SKINNER CHUCK COMPANY



340 CHURCH ST., NEW BRITAIN, CONN.

HAND & POWER OPERATED MACHINE CHUCKS—AIR CHUCK EQUIPMENT—FACE PLATE JAWS—MACHINE VISES

SHAVE "Per Piece" COSTS

with the new

Self-Indexing

Enco HEXTURRET

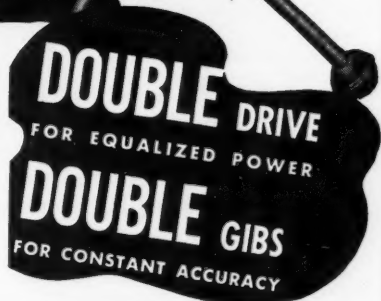
—the better bed turret



PATENT
PENDING

It's easy to cut lathe time on every operation. Enco's Hexturret has the accuracy, rigidity and speed to step up output and thereby reduce unit costs . . . This versatile bed turret provides a wide range of uses—including drilling, counterboring, spotfacing, threading and many other operations. New **DOUBLE BED CLAMP** prevents crawling under heavy cuts . . . Unique **DOUBLE DRIVE** assures quick, easy slide movement. Only ENCO offers as many features. Adapt every bench lathe in your shop to a **DUAL PURPOSE, DUAL PRODUCTION** machine. Write today for complete details.

Address Department 17



ENCO'S "DOUBLE-DRIVE" PRINCIPLE



Push a block with one finger. Pressure on an edge pushes the block to one side. The same is true with a single drive and one gib . . .

friction and wear are created. Enco's double drive equalizes power and prevents uneven wear.

ENCO MANUFACTURING COMPANY

General Office and Factory: 4522-24 Fullerton Avenue, Chicago 39, Illinois

EXPORT DIVISION: ENGINEERING BUILDING

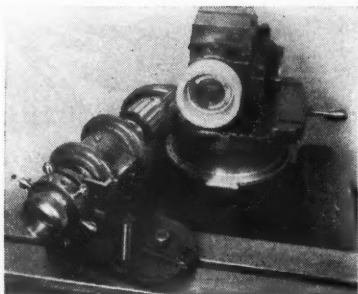
205 W. Wacker Drive

July, 1946

MODERN MACHINE SHOP 95

Axial Relief

GRINDING FIXTURE



Typical set-up for grinding cutting chamfers on taps.

NEW
MULTI-PURPOSE
FIXTURE

HERE'S a fixture that will save you the expense of buying special duty machines for such work as grinding cutting edges, steps, flutes and chip relief on milling cutters, burring tools, counterbores, counter-sinks, end mills, reamers, drills and taps.

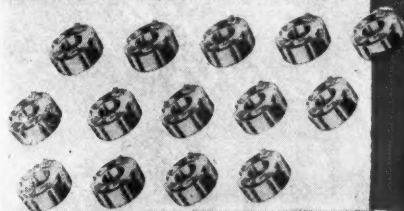
All adjustments simple, visual and external. Instantly adjusted to right or left hand. Axial relief automatically equalized on all flutes. Can be used on surface grinders as well as cutter grinders. Performs most jobs with standard grinding wheels.

Send for literature explaining simplicity of operation and illustrating typical applications.

WRITE FOR
Literature

GOVRO-NELSON CO.

1933 Antoinette
Detroit 8, Mich.



Injection Molds Completed

5 TIMES FASTER
ON A
GORTON

3-DIMENSIONAL
PANTOGRAPH

JOB FACTS

NAME OF PART—Injection
Mold.

MATERIAL—Tool Steel (oil
hardening).

MACHINE—Gorton 3-Dimen-
sional Engraver Model
3-L.

ATTACHMENTS—Standard
three jaw chuck mounted
on table.

TOOLS USED—Special Cut-
ters ranging from .035"
dia. to .340" dia.

TEMPLATE USED—2 to 1 full
shape master.

FORMER TIME—15 hours per
mold.

PRESENT TIME—3 hours per
mold.

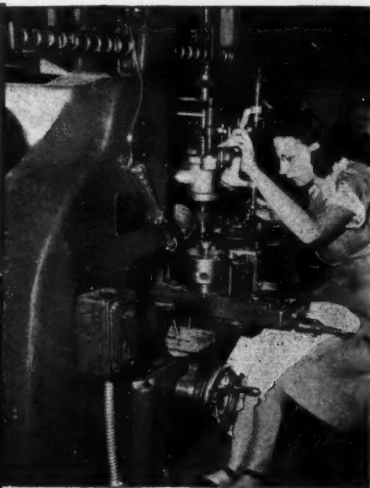
ACCURACIES—All dimen-
sions held to .0005".

**HOW TO PREDETERMINE THE RESULTS OF TOOL-
ING YOUR JOB ON A GORTON PANTOGRAPH**

Send detail prints or a work sample to Gorton Engineering Service at the address below. Tooling information and production estimates will be furnished promptly—no charge or obligation. You can then predetermine the possible improvement over your present methods.

GEORGE GORTON MACHINE CO.

1707 MADINE STREET, MADINE, WISCONSIN, U.S.A.



*Machining Time Reduced from
15 Hours to 3 Hours per Mold*

ACCURACIES HELD TO .0005"

Here's an example of the type of performance you'll get on a Gorton 3-Dimensional Pantograph Engraving Machine. This large manufacturer experienced difficulty in the production of these injection molds. Time required was 15 hours per mold.

Accuracies were hard to maintain. Machine down-time was excessive. Man hours were wasted.

In an effort to remedy these, the job was tooled-up on a Gorton 3-Dimensional Engraving Machine. First an enlarged master template was cut. Then, using this as a pattern, the desired molds were turned out at the correct size at the rate of one every 3 hours. The other disturbing factors were also remedied. Dimensions were held to .0005" due to Gorton pantographic reduction method. Down-time was drastically reduced. Man hours were conserved.

QUALITY WORK ON A PRODUCTION BASIS

Gorton Pantograph Machines are noted for the consistency with which they turn out quality work on a production basis. They are available in both 2 and 3-dimensional models to handle many types of reproduction assignments. They can be used with high efficiency on any machinable material and their operation is extremely simple.

**FREE ADDITIONAL
INFORMATION**

Get the details on
Gorton Pantog-
raphs and other
Gorton machines
by sending today
for your copy of
Bulletin No. 1655.



SOLVE YOUR
Rivet-Setting Problems
with **T-J RIVITOR**

*Automatically
FEEDS AND SETS
SOLID RIVETS*

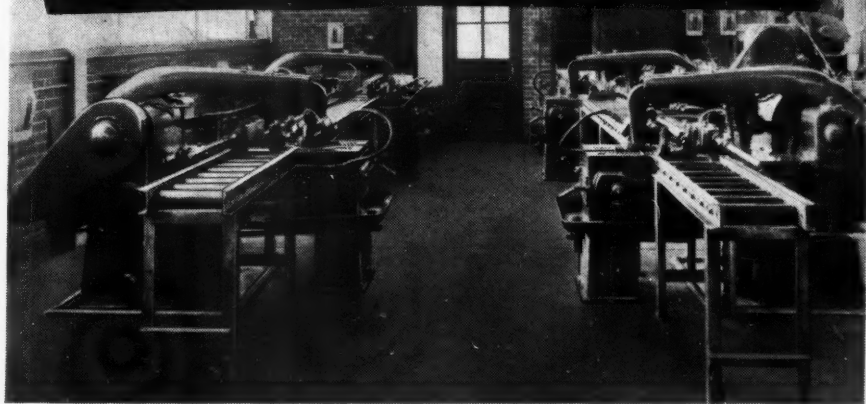
You can set a fast pace in riveting operations—and count on smooth and steady production—with the T-J RIVITOR! Designed to increase speed and efficiency of riveting and assembly in many industries. Electrically powered for automatically feeding and setting solid steel rivets $\frac{1}{16}$ " to $\frac{1}{4}$ " dia. incl. and up to $\frac{7}{8}$ " incl. long. Has *controlled setting action*—assures a completely filled hole... no flashing... a neat, balanced head. Makes a solid rivet joint of 10% to 15% greater strength. Sturdily built... trouble-free performance. Write for bulletin. The Tomkins-Johnson Co., Jackson, Michigan.

29 YEARS EXPERIENCE

TOMKINS-JOHNSON
RIVITORS

SPECIFY  FOR TOUGH JOBS

Repeating a Good Performance . . .



. . . at a hundred different spots

The picture above was taken in the plant of a big, nationally known metal fabricator; user of more than one hundred Racine heavy duty Hydraulic Production Saws. Stock rests illustrated are the customer's own design and construction. The machines are used for cutting billets, and shaped materials in production quantities, as well as for test cuts and special operations.

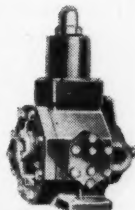
Repeated purchase of Racine Equipment was based on specific performance records. Easy loading, accurate work, big output, dependability and low upkeep costs insure continued economies, to meet current competition and high labor costs.

Racine Machines provide these features. Single lever control of powerful hydraulic, progressive feed, the correct metal cutting principle. Open front for quick loading and pivoted arm for proper blade application. Rugged construction with few moving parts. There are several models of Racine Machines in all capacities from 6" x 6" to 20" x 20". Ask for copy of our complete catalog No. 12.

Racine oil hydraulic pumps and valves

Power movement operations can be handled to better advantage with hydraulic force. Use RACINE variable volume Pumps, available in capacities from 0 to 30 G.P.M. Pressures from 50 to 1000 lbs. P.S.I. Control Valves for hydraulic circuits from $\frac{3}{8}$ " to $1\frac{1}{2}$ " I.P.S. Get our catalog P-10-C. Write today.

RACINE TOOL and MACHINE COMPANY
1770 State Street • Racine, Wisconsin



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Tannewitz

the DI-SAW with Extra SPEED AND EXTRA STAMINA



Did you ever hear of a transmission going haywire on a TANNEWITZ DI-SAW? No, neither did we, though we have been making die saws for a good many years. And that's just typical of the superior construction of the entire machine. It can take the severest kind of use and always be ready for the next job. Moreover the standard model has larger wheels than customary in machines of this type — a full 24 inches —

for greater traction, straighter, faster sawing and more production. Get the complete facts and you'll discover why TANNEWITZ DI-SAWS always show

the best possible return on an investment in equipment of this kind. Write for "DI-SAW" Bulletin.

OTHER MODELS TO HANDLE WORK OF PRACTICALLY ANY SIZE

make available the tremendous savings of inside and outside sawing, filing and polishing on dies, jigs and other work too large to handle on the standard machine. Bulletin on request.

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GRAND RAPIDS 4, MICHIGAN

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HYDRAULIC PRESSES
PRESS BRAKES**

**Don't Let Delayed
Delivery Hold You UP**

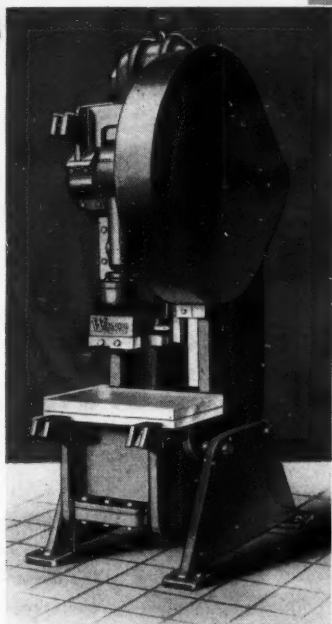
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WELDED STEEL PRESSES**

**Weldments
Fully Stress-Relieved**



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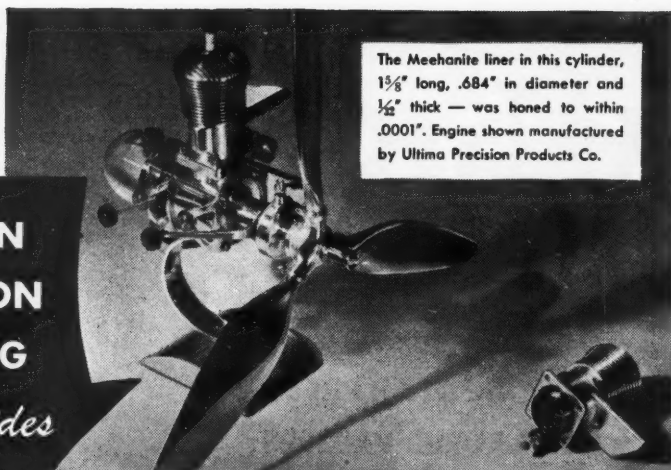
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1942 GRISWOLD STREET, WARREN, OHIO

A Subsidiary of The Federal Machine and Welder Company
Offices in Principal Cities

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The Meehanite liner in this cylinder, $1\frac{1}{8}$ " long, .684" in diameter and $\frac{1}{32}$ " thick — was honed to within .0001". Engine shown manufactured by Ultima Precision Products Co.

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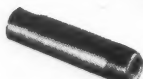
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SUNNEN PRODUCTS CO.

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128

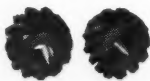
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Compressor Yoke. Alignment maintained and better finish produced.

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COMPLETE RANGE
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DRILLS FROM $\frac{1}{32}$ " TO 1"



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HOLD DRILLS SECURELY *without bushings*.
MODERNIZE ALL YOUR MACHINES NOW
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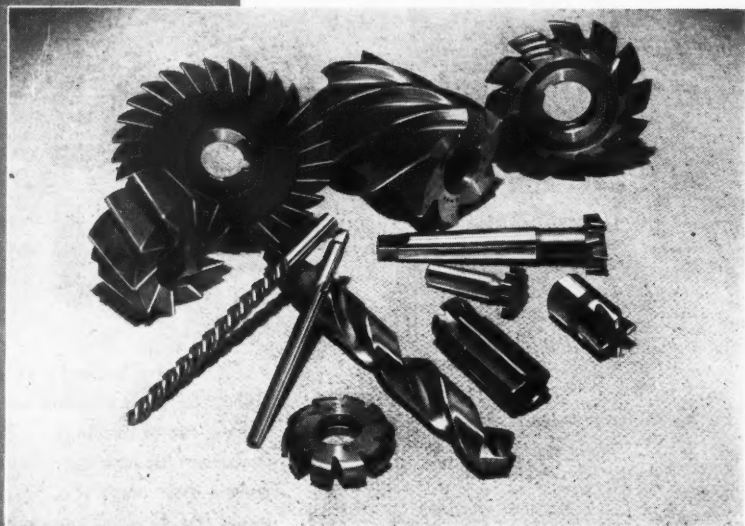
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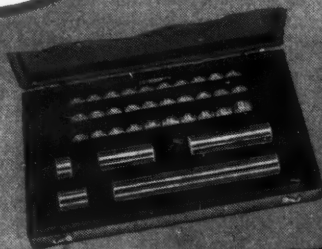
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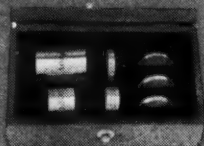
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Gives 121 combina-
tions \$15.00



Set MT MICRO-
GAGES. Over 5,000
combinations in
thousands \$35.00

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faster speeds



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... because they produce a mirror-like finish at "roughing" speeds. In most cases, the need for additional finishing operations on the hole is eliminated. Madison's simplicity of design and operation makes this possible.

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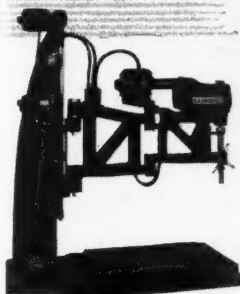


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MUSKEGON, MICHIGAN

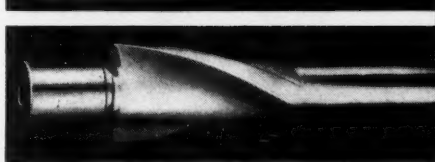
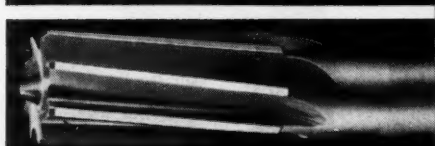
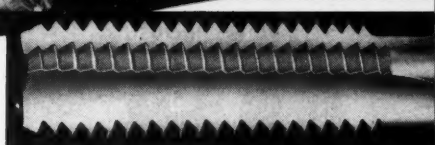
MADISON MANUFACTURING COMPANY

A *Versatile* RADIAL DRILL



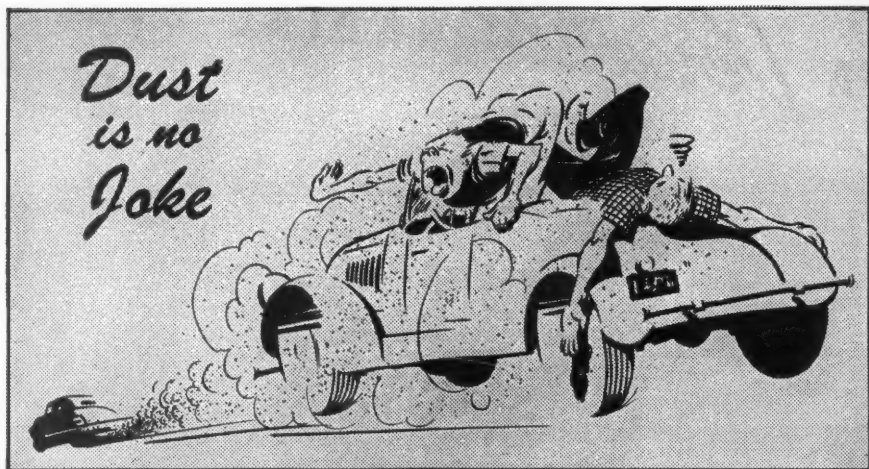
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THE FOOTE-BURT COMPANY • Cleveland 8, Ohio



FOOTBURT-HAMMOND

Radial Drilling Machines



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have proved their ability to solve the abrasive dust problem

Over 10,000 TORIT Dust Collectors are now in use. They are cleaning and re-circulating the air from grinding, polishing and cut-off saws in all types of American industry.



TORIT Dust Collectors fit all machines requiring dust control. Self-contained and compact in design, they are easy to install. They require no extensive piping, and are economical to operate. Get Torit Catalog No. 30 for complete information.

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SELF-CONTAINED UNITS

Do it Better...ON A

Hydratrol Lathe!

LARGE HOLLOW SPINDLE TYPE

5 sizes-18" to 36"

Small, 18" up to 7-1/8" Hole

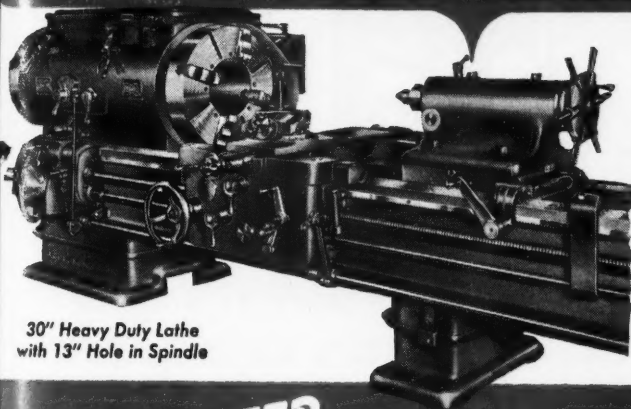
Medium, 24" up to 12-1/8" Hole

Large, 27" up to 13-1/8" Hole

Large, 30" up to 14-1/8" Hole

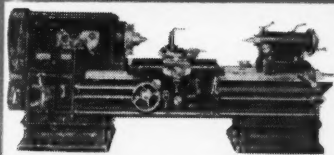
Large, 36" up to 16-1/2" Hole

(Standard Type)
lathes, 16" to 36"



30" Heavy Duty Lathe
with 13" Hole in Spindle

*** DO IT FASTER**
*** DO IT MORE EASILY**
*** DO IT MORE ACCURATELY**
*** DO IT MORE ECONOMICALLY**



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The big 27" size, shown above, has all the ruggedness and power for the heaviest possible work. And its many refinements in design and construction result in an ease of operation comparable to small machines.

Precision • Speed • Endurance
Long Life - Absence of Mechanical Troubles!

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High Temperature Furnace at Sivy Steel
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FOR ALLOY STEEL CASTING RESEARCH

SIVYER STEEL ...MILWAUKEE has

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Now, For Multiple-Spindle Automatics

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Solves all your stock feeding problems. Feed fingers, feed tubes and related parts are completely eliminated. Stock bar is fed any distance and held positively against the stop. Each bar is supported in a revolving cup center at one end and in the collet of the machine at the other. There is never any contact with the remainder of the bar. That's why you can use exact-size polished stock without danger of scratching or

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FEED FINGERS

➡ ➡ ➡ ➡ (and pushers)

Specially built Lipe Pneumatic Bar Feeds for multiple-spindle automatics have been proved in service. Now standard units are offered for most popular machines and specials for any machine rated at 2½" or less. Also for Cone four-spindle verticals.

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Lipe Pneumatic Bar Feed for Brown & Sharpe automatic screw machines and all hand machines.

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for Me!"

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QUALITY	CARBON	CARBON-VANADIUM
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THESE Special, Extra and Standard QUALITY Tool Steels are made for economic selection according to end use. The advice of our Sales and Metallurgical Departments is yours for the asking.

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* One of the series of six Vasco Tool Steel Classifications covering every industrial requirement.



VANADIUM-ALLOYS STEEL COMPANY

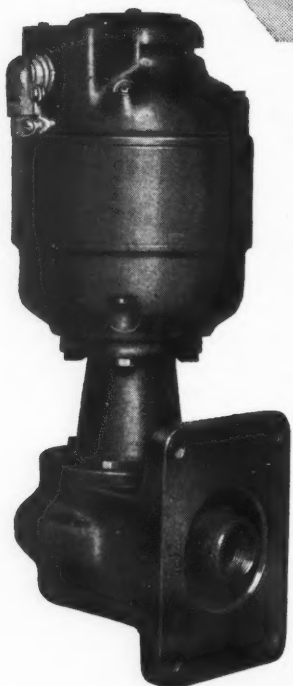
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Latrobe, Pennsylvania

COLONIAL STEEL DIVISION . . . ANCHOR DRAWN STEEL CO.

Eliminates outside piping...

**"GUSHER"
FLANGE MOUNTED
INTERNAL DISCHARGE
COOLANT
PUMPS**



**MODEL 11020A
Flange Mounted
Internal Discharge**

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For mirror-finish precision reaming, always specify Morse Reamers. You'll see the difference in faster cutting, better work, and longer time between replacements. You'll find the same difference in all Morse Tools.

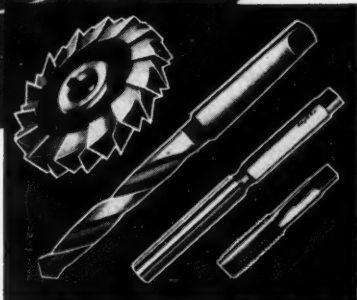
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July, 1946

MODERN MACHINE SHOP 115

5 GRINDING JOBS with 1 MACHINE...

SHARPENING
CYLINDRICAL
INTERNAL
RADIUS
SURFACE

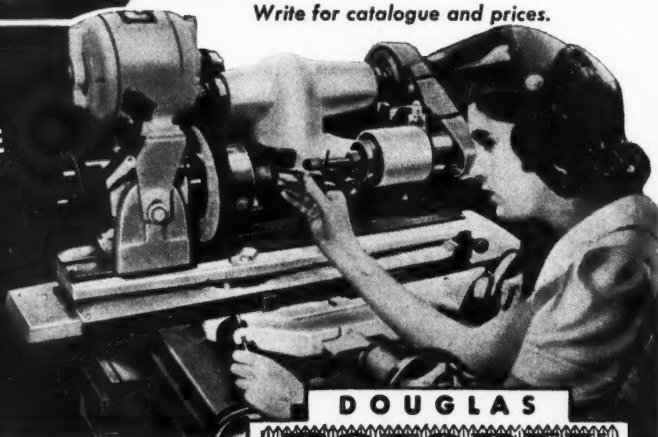


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DELIVERY



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ROTOREX
GRINDER

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.. against ~~any~~ Chuck you are using

for ACCURACY



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That's why we say—TEST A WESTCOTT.

WESTCOTT—Precision manufacturers since 1872

WESTCOTT

Chucks

PRECISION • DEPENDABILITY • SERVICE

SEND

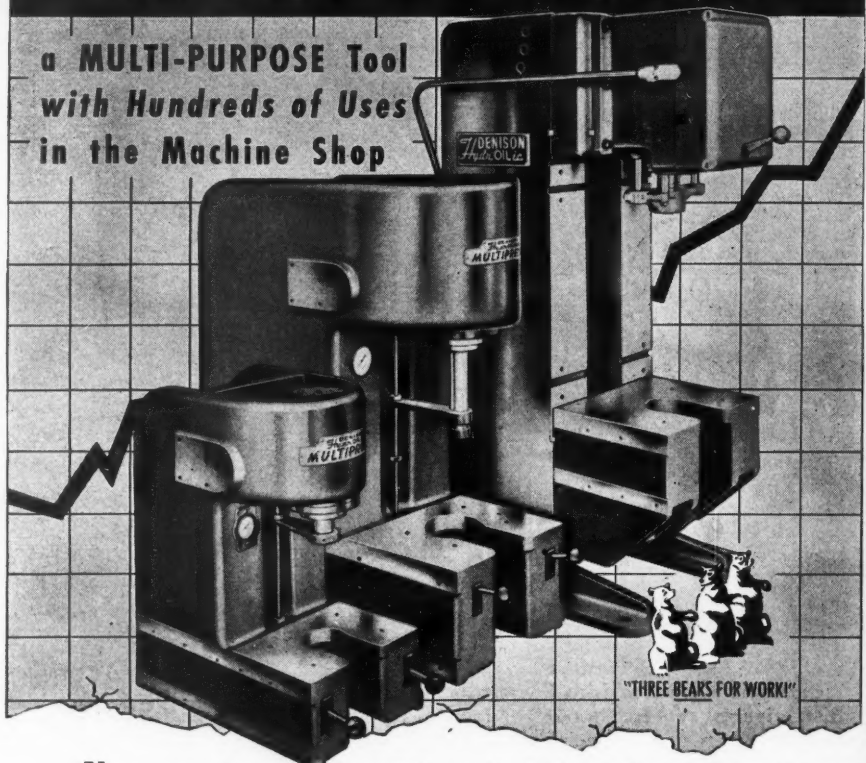
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Westcott Chuck Co.
738 E. Walnut St.
Oneida, N.Y.



MULTIPRESS

a **MULTI-PURPOSE** Tool
with *Hundreds of Uses*
in the Machine Shop



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In addition, an extremely wide variety of

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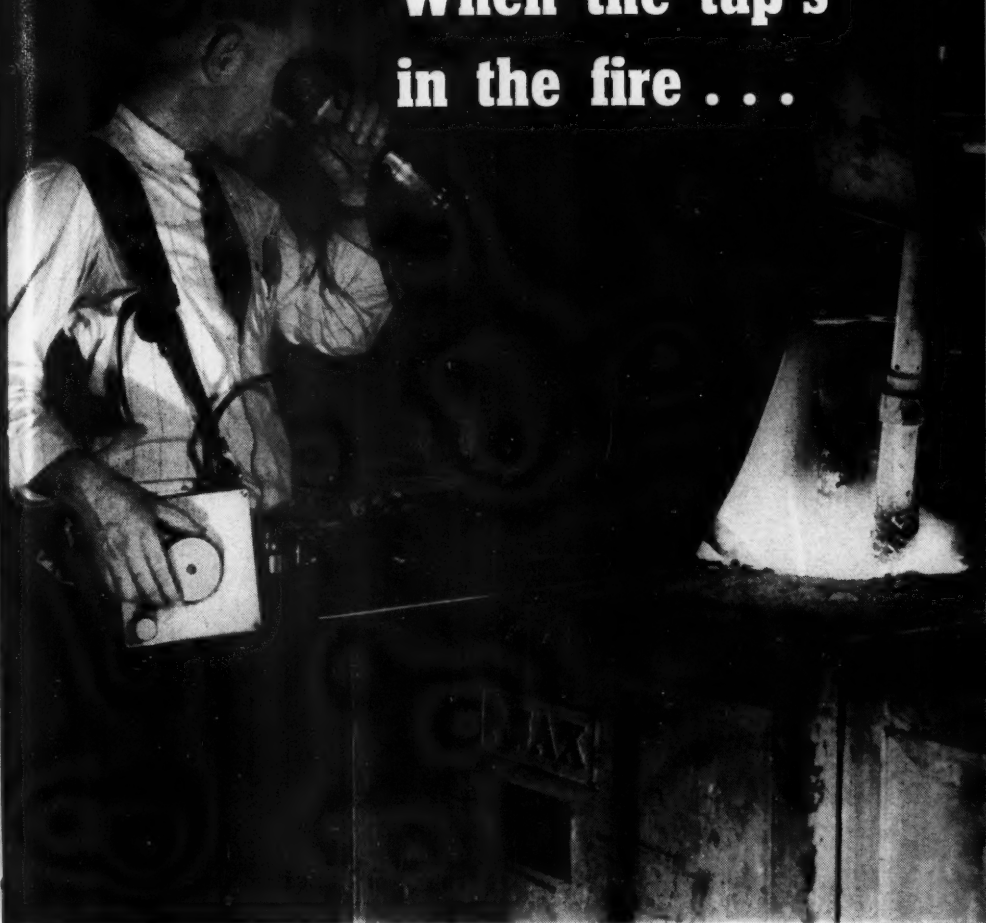
No matter *how* you're handling pressure-application jobs within the eight-ton range—no matter how different your needs may seem—MULTIPRESS may have production-boosting surprises in store for you. Write for information!



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Hydraulics

THE DENISON ENGINEERING CO., 1153 DUBLIN RD., COLUMBUS 16, OHIO

When the tap's in the fire . . .

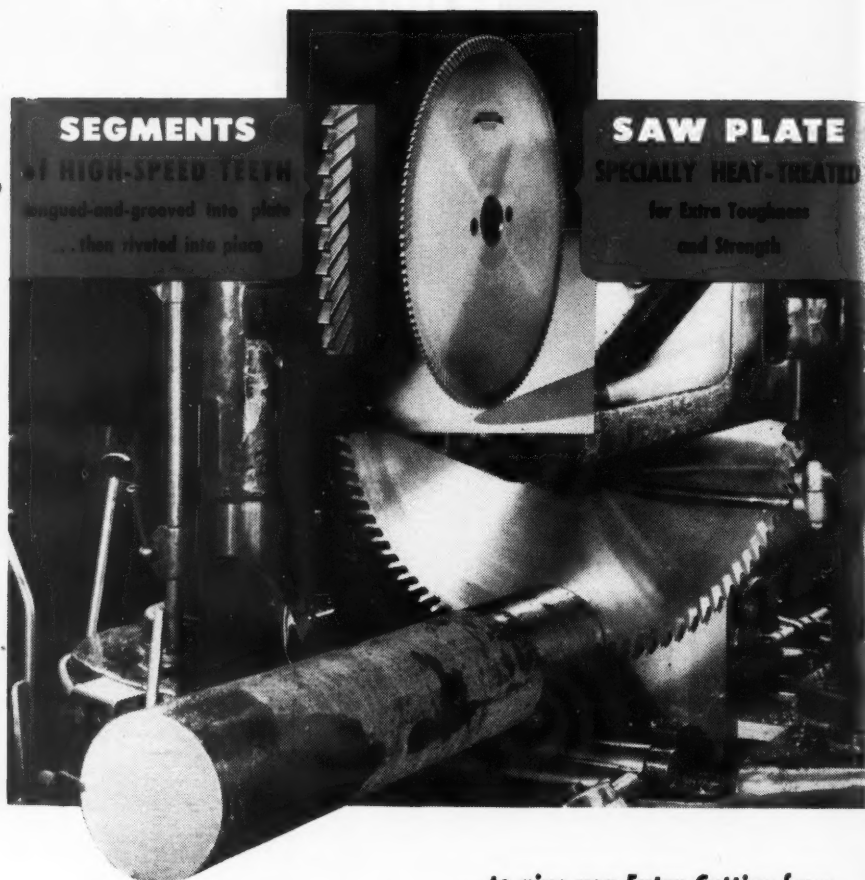


This "Greenfield" man is measuring heat with as much precision as though he were using a micrometer to measure size. He is using an optical pyrometer. On his technical skill depends to a large degree the performance of the finished product in your plant. Improved furnaces, precise heat measuring devices, and the continuing accumulation of "know-how" have made the heat treating of tool steels an exact science in "Greenfield" plants.

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GREENFIELD TAP and DIE CORPORATION
GREENFIELD, MASSACHUSETTS



SEGMENTS
 of HIGH-SPEED TEETH
 tongue-and-grooved into plate
 ... then riveted into place

SAW PLATE
 SPECIALLY HEAT-TREATED
 for Extra Toughness
 and Strength

This fine-tooth saw delivers maximum cutting-life on work requiring a fine pitch or specially smooth cut. Double-lap construction, with teeth-segments secured *and aligned* in place by 5 rivets, gives greatest tension and torsion strength... and makes the saw run true, *without vibration or chatter*, under the highest cutting pressure. Special tooth-design channels the coolant right to the cutting edge, so that dulling from friction-heating is long deferred. And even when teeth do dull, the segments are quickly and easily replaced. Order Simonds Segmental Saws from your Industrial Supply Distributor, or get in touch with the nearest Simonds office, listed at the right.

...to give you Extra Cutting from

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FITCHBURG, MASS.

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MODERN Machine Shop

HOWARD CAMPBELL, Editor

VOLUME 19

NUMBER 2

JULY, 1946

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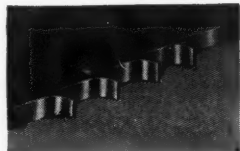
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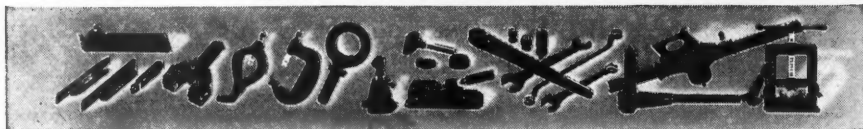
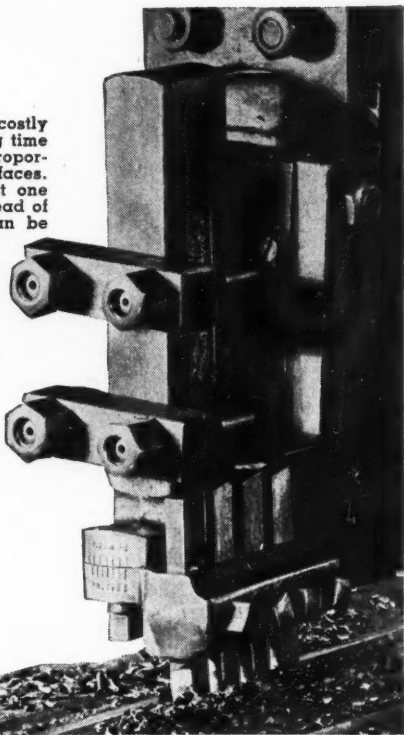
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MODERN Machine Shop

JULY, 1946

VOL. 19, No. 2

CINCINNATI, OHIO

This Month

From the number of letters that have been received asking for additional information it is evident that John Hyler's series of articles on "Modern Engraving Machines and Methods" has been useful and interesting. The concluding article will be found on page 124 of this issue.

Manufacturing executives in plants where a great deal of soldering is required in the production of the product will find some good material in the article "Phos-Copper Brazing of Armature Coils," written by C. Lynn of the Westinghouse Electric and Manufacturing Company. Mr. Lynn discusses the advantages of phos-copper and presents some descriptions and photographs of the equipment used in the application of this material. Page 136.

Articles discussing bearing design and materials have appeared in this publication from time to time, but never before have we gone into the subject of bearings made from wood. In the article "Bearings Without Oil," on page 158, Mr. Leland B. Watson discusses the applications for which wood bearings have peculiar fitness and presents some interesting illustrations. He did not, however, include a discussion of wood as a bearing material for the propeller shafts in large ships, which is the most interesting application of which we know. Undoubtedly wood bearings have their place.

It is our opinion that the pay of every worker in a manufacturing plant—and that includes the top executives—should be based upon some kind of incentive plan, and so we are always glad to have the advantage of someone's experience in this field. On page 174 Clinton Davidson, President of Management Planning, Inc., presents an interesting discussion under the title "Incentive Plans for Top Executives." The top executives will find it worth reading.

C. W. Hinman, whose articles on tool design have appeared frequently in the pages of MODERN MACHINE SHOP, has developed a unique idea for increasing workers' pay by reducing prices. He tells about it on page 184.

A number of interesting applications of modern equipment and some unusual designs for homemade tools will be found in the sections "Modern Equipment at Work" and "Ideas from Readers," on pages 188 and 198.

The editor will probably come up with a few thoughts on the current industrial situation again, and if he does you will find them on page 398.

Modern Engraving Machines and Methods, III

The concluding section of this article, in which the author discusses the applications and advantages of portable engraving machines.

By JOHN E. HYLER

PORTABLE engraving machines of the small size which can readily be moved from place to place have been mentioned previously in this article, but the use of the machines referred to is restricted to the engraving of very small parts. However, there is another aspect to engraving machine portability. Manufacturers of the larger and more versatile machines have in some cases designed the essential parts of the machines so that they can be adapted for portability, thus making it possible to engrave very large work that could not be handled otherwise.

One case was noted in which an engraving machine of advanced type had been designed in such manner that it could be positioned directly on the surface to be engraved. The task in this instance consisted of engraving a trademark at equally-spaced intervals over the surface of a large carpet die. The trademark was engraved in 15 places in the surface of the platen, the engraving machine being relocated for the cutting of each of the marks.

In some instances a machine of the stationary type has been adapted for portability by mounting it slideably on a rail and providing means whereby it may be traversed along the rail to any given point. This method has been used to accomplish the engraving of very large steel rolls. In such cases a special layout must necessarily be used in order to work to the best advantage.

The forming guide layout described in a previous article can be used for engraving the surface of a roll in the same manner as on any other convex surface, but the area that can be engraved at one setting with the forming guide layout is restricted, especially on rolls of small diameter. The reason is that the cutter spindle always remains vertical as it follows the former guide, and therefore cuts straight downward upon a cylindrical surface only at the center line of the cut. As a result, a slight bit of undercutting occurs at the outer edges of the engraving which, although negligible and unnoticeable on engravings of relatively small area, is often a

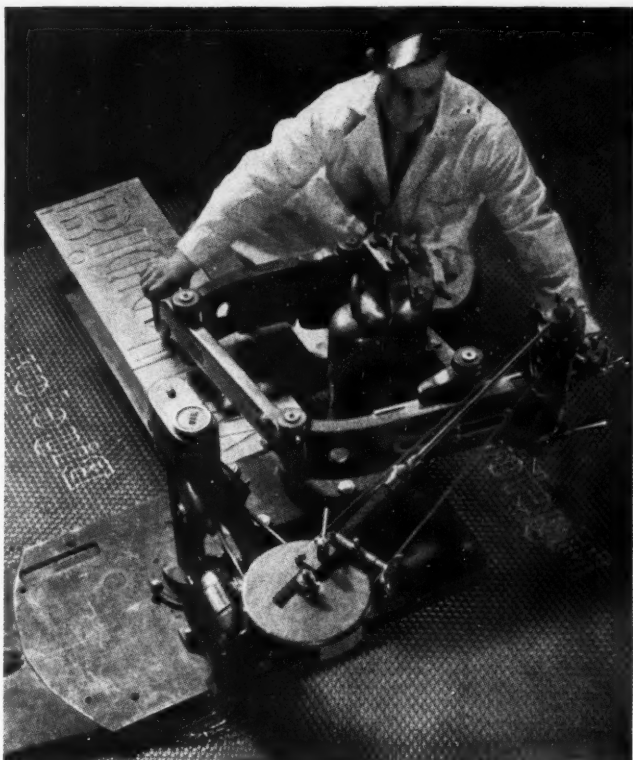
Work that is too large to be mounted in any machine is engraved by means of a pantograph machine of the type shown here, where a trade mark is being engraved on a large hot-press carpet die. The machine is rigidly supported on a heavy bedplate positioned on the work and moved by the aid of a crane from one position to another. Standard Gorton cutters were used and the design was cut $\frac{1}{8}$ inch deep. The master copy was about $2\frac{1}{2}$ times larger than the design.

(Courtesy George Gorton Machine Company.)

factor to be reckoned with when the roll is to be used for transferring the engraved design to other material.

Another factor to be considered in the engraving of rolls is that many such rolls are engraved completely around the periphery. It then becomes important to control such engraving by some means that will make it possible to space the characters around the periphery without error and to do it mechanically, so that the human element will not be a factor. To this end, a number of roll-engraving methods have been devised by one of the leading builders of this type of equipment.

One of the applications, especially intended for use in engraving rolls of large diameter and more or less length, is made in the form of an extended bed with two special saddles to support the roll journals. The saddles can be adjusted for rolls of dif-



ferent lengths, and are also adjustable for height so that the top line of surface of a roll of any diameter can be brought into the working plane.

Parallel to the bed, and elevated above it at the rear, is the massive slide-rail previously mentioned which supports the engraving machine. Extending along the under side of the rail is a rack which is engaged by a handwheel-actuated pinion on a shaft that extends through the machine assembly, making it possible to locate the machine at any desired point along the rail. Thus the roll can be revolved in the saddles as the engraving operation proceeds, making it possible to engrave the entire surface



Large hot plate press platen with engraving completed, showing 15 trademark designs as per specifications.

(Courtesy George Gorton Machine Company.)

of the roll while the cutter is at all times pointed directly at the axis of the roll.

This equipment is available in two sizes, either of which will handle rolls up to 30 inches in diameter. One size will engrave rolls up to eight feet in length; the other has capacity for rolls up to 12½ feet long. The same type of equipment, with variations, can be used to engrave work that is conical in form.

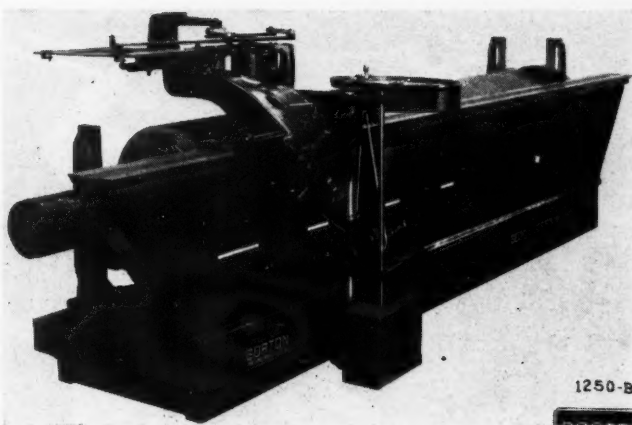
For engraving small rolls, roll engraving attachments which can be applied to some of the standard engraving machines are available. One such attachment has capacity for handling rolls from ¾ inch to 3 inches diameter and up to 7 inches in

length. Other attachments, for use on other types of machines, will engrave rolls from 1½ to 6 inches in diameter and up to 12 inches in length. No forming guide is required with these attachments; the roll is rotated automatically by the lateral movement of the tracing style over the master copy.

The correct speed of roll rotation for reproducing a design completely around rolls of any diameter and spacing it properly is governed by a compensating mechanism, built into the attachment, which can quickly be set by means of a single scale that is graduated in sixteenths of an inch. This mechanism not only eliminates all need for change gears or other

Rear view of machine for engraving large rolls. Here the slide rail on which the pantograph is mounted, together with the handwheel, rack, and pinion by which the pantograph is moved to any point along the rail can clearly be seen.

(Courtesy George Gorton Machine Company.)



1250-B

similar device, but also permits accurate engraving on an infinite variety of roll diameters, within the scope of the attachment.

The decision as to whether one will use such an attachment or a set-up consisting of a combination of a forming guide and suitable indexing mechanism will depend largely upon the amount of such work to be done, and also upon the area that is to be engraved at each step of the indexing. Characters of relatively small size can be cut in small thimbles and rolls with good results by the forming guide and indexing method, if the

work comes in small lots; therefore this process is often used. In this connection bench centers are often used, also, and may be obtained from the machine manufacturers.

Stylus Design

The shanks of all styluses are round, but the ends, or cutting points, vary in form according to the nature of the task. Where V-groove copy is being used, a stylus is used that has a 90-degree included-angle conical point. For working in square-bottom

Machine for engraving very large rolls. Note that the roll is supported in saddles which allow it to revolve as the operation proceeds. The pantograph, which can be seen above at the right, is supported on a rail behind the roll.

(Courtesy George Gorton Machine Company.)





Work that is tapered, or which is not truly cylindrical in form, can be engraved in the same machine in which other large rolls are engraved by using special holding fixtures or by modifying the saddles in which the work is supported.

(Courtesy George Gorton Machine Company.)

are available in two different designs, one for marking hardened steel or glass, and the other especially suited for bakelite and fibrous materials.

grooves, or on relief work, a stylus is used which has a diameter equal to that of the cutter, but is cut off square at the bottom. In cases where a cutter of relatively large diameter is being used, however, a stylus with a roller on the bottom or contacting end may be used.

Such rollers may vary in diameter from 0.300 to 0.800 inch, in increments of 0.100 inch. Some users keep full sets of rollers so that any diameters required will be available. Accuracy can be no closer than the relative accuracy of the stylus and cutter. It is good practice to keep on hand a full assortment of both styluses and cutters, not only to meet the needs of the various jobs, but also to preclude the necessity of taking time out to sharpen a tool when such time can ill be afforded.

Cutters and cutter blanks adaptable for any kind of work are available; thus it is unnecessary to use a cutter on any job for which it is not well adapted. It has already been mentioned that diamond-point cutters

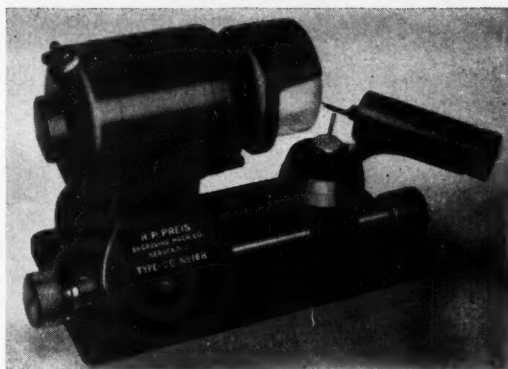
Carbide-tipped cutters are also available for production work on abrasive materials such as rubber, bakelite and fibre. These tools can be run at much higher speeds than ordinary cutters for these purposes and have from 10 to 50 times the working life of high speed steel tools.

High speed steel cutter blanks are, however, ideal for many kinds of work and may be obtained in a full range of sizes from 1/10 inch up. Cutters 1/10 inch and 1/8 inch in diameter are often held in so called Midget chucks, designed for this purpose. These chucks provide suitable support for the cutter, yet allow sufficient extension to provide good visibility when working into tight corners.

Ground-tooth mills or burrs have been found especially useful in taking finishing cuts when using stone composition models, as mentioned in the previous article. The teeth of these burrs are spirally ground on the tool, and for that reason are constantly in contact with the work. Due to the smooth operation of these tools, less

The small bench grinder shown here is especially adapted for sharpening single-lip engraving and routing cutters, although it can be fitted with an index unit which makes it suitable for grinding 2-, 3- or 4-lip cutters to any angle and clearance desired. Grinding depth is controlled by means of the knurled finger-grip at the left end of the machine while the operator controls the adjustment of the cutter by means of the knurled knob at the right.

(Courtesy H. P. Preis Engraving Machine Co.)



pressure is exerted by the stylus against the model. They are particularly well-suited for smooth finishing cast iron molds and patterns, but are also useful for taking the finishing cuts on steel dies and molds. A roundnosed burr of this type has teeth completely covering the nose. Square-end burrs are provided with teeth on the end, unless they are specially ordered.

Single-flute cutters or end mills, as well as end mills of two-flute and four-flute types, are available from manufacturers of engraving and duplicating machines in a full range of sizes. Some users maintain complete cutter sets that include all of these types; thus

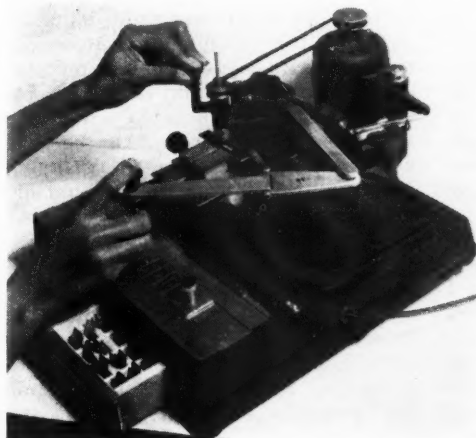
they are enabled to select the proper cutters for the jobs in hand. Having an adequate selection of cutters on hand has often meant the difference between a high-grade product and one of mediocre quality.

Cutter Maintenance

For a wide range of engraving work, single-flute cutters are highly efficient and extremely economical. In equipping for a heavy flow of engraving, no plant can afford to ignore them. However, single-flute cutters cannot be sharpened correctly on

standard cutter grinders, thus manufacturers of engraving machines have designed special machines for this purpose.

One type of cutter-sharpening machine is a small bench-type unit carrying a cup wheel on the horizontal arbor and fitted with a cutter-holding spindle so arranged that it can be ad-



The feature of the machine shown here is that the movement of the engraving spindle is controlled by spring pressure, permitting the stylus to be placed in the master groove before the cutter is in contact with the work and thus increasing accuracy and speed.

(Courtesy New Hermes, Inc.)



Here an experienced mechanic is using an Arkansas Square File to stone a small cutter for a pantograph engraving machine.

(Courtesy Behr-Manning Corporation.)

vanced to the wheel in the manner calculated to produce the correct grind on the end of the tool. Extending along the base of the machine, mounted in suitable bearings, is a shaft the left-hand end of which carries a knurled finger grip with which the depth of the grinding can be controlled with the left hand while the right hand is being used to rotate the cutter being ground. With this tool cutters are always ground true to center; there is no necessity for testing the sharpened cutters for concentricity, angle or proper clearance. The cutter-holding spindle on this unit is also mounted atop an indexing unit, making it possible to grind a two-, three- or four-lip cutter to any angle and clearance desired.

A special cutter grinder that can be fitted with a universal toolhead particularly designed for handling and grinding single-flute cutters with shanks in any size up to $\frac{5}{8}$ inch diameter, with square, conical or ball nose, as desired and which will produce any predetermined angle, radius

or diameter with any amount of clearance has been put on the market by one of the leading manufacturers of engraving machines. An indexing dial and plunger has been incorporated in the design to permit the grinding of cutters with one, two, three or four flutes, a tooth rest being provided for multi-flute cutters. Micrometer dials on all adjustments are graduated in thousandths, and a precision collet sleeve is used, that will take collets varying from $\frac{1}{10}$ to $\frac{5}{8}$ inch in capacity. The machine can be used to grind carbide cutters, when desired, by simply substituting diamond-impregnated wheels for the purpose.

Some of the engraving machine manufacturers will supply cutter grinding attachments that employ mounted wheels, by means of which cutters can be ground while mounted in the pantograph machines. However, this is really a compromise method, designed for shops that lack room for cutter grinding machines. While a very fair job of grinding can be done with such an attachment, grinding dust is scattered over the machine and some of it inevitably finds its way into the machine slides and bearings. Specific instructions for the proper grinding of all types of engraving machine cutters can be obtained from the manufacturers of the machines and attachments.

Stoning is an important factor in the proper sharpening of engraving

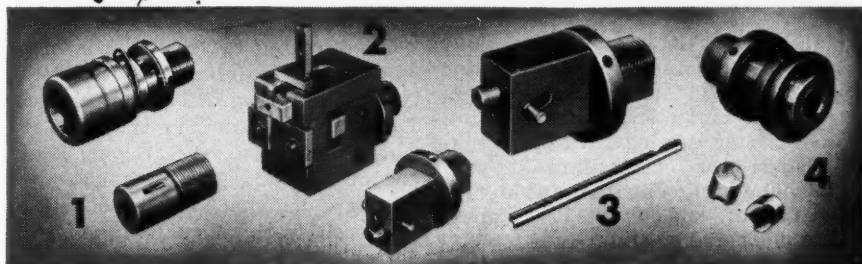
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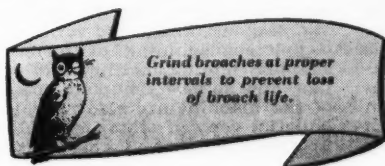
To help you get the most from your broaching equipment, American has published an illustrated booklet on broach pull heads and their uses. Write for free copy. It is part of American's complete broaching service—machines, tools, and engineering.



Four types of American Broach Pull Heads are illustrated. (1) Automatic 4-Jaw Type Puller for horizontal or pull up use. A similar model, with chip shield, is made for pull down use. Standard sizes for shanks from $\frac{1}{4}$ " to $3\frac{1}{2}$ " diameter. (2) Automatic Keyway Broach Pull Head for use with keyway square, rectangular, and oval broaches. Broach is rigidly held in proper alignment. Set of adapters permits using old style threaded keyway broaches with this head. (3) Automatic Pin Type Puller for use with broaches having shanks $\frac{1}{2}$ " in diameter or smaller. Holds shank by means of a half-round groove cut across the pulling end. Automatically provides positive radial positioning. (4) Type "V" Quick-Change Broach Puller for use with broaches having old style threaded shank. The two-piece jaws are quickly and easily removed while head is in ma-

chine. Eliminates necessity of screwing broach into place. Replaceable jaws furnished for all sizes of threads up to 1" diameter.

Slotted type broach pullers and ordinary threaded broach pullers, not illustrated, are also available.



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Using an engraver's "pencil" to stone rough spots on a steel hob used in making parts for jewelry.

(Courtesy Behr-Manning Corporation.)

mounting practically eliminates the possibility of breakage. Special engravers' stones are also used to remove any slight roughness on the surfaces of finely-engraved models, dies, and so on. This applies especially in the case of hobs and dies used in the manufacture of jewelry and similar products.

cutters, especially if the cutters are small. Stoning is an operation that requires training and experience, however, and should not be left to the average workman. Except where hair-line engraving is being done, the points of conical-type cutters are "tipped off" by stoning to eliminate the highly delicate point, and only the best stones available should be used.

Some of the stones used for stoning engraving tools are only about $\frac{1}{8}$ inch square and are mounted in wooden pencil mountings so that the wood can progressively be cut away as the end of the stone wears down. Such a

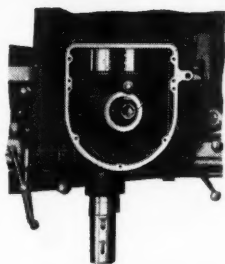
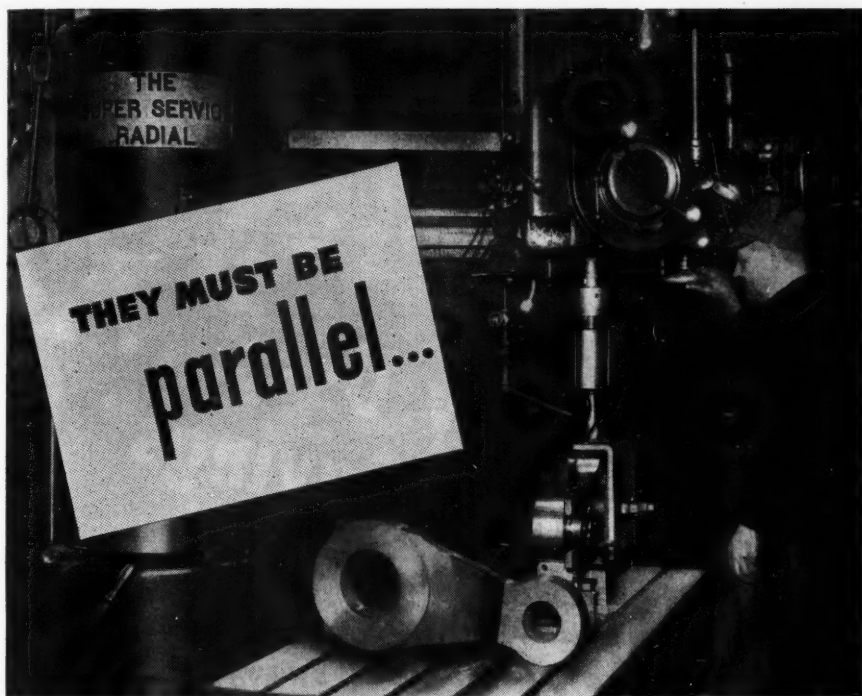
Finally; it may be well to mention that engraving by free-hand is often employed at points where the usual type of engraving tool cannot be used. The free-hand method is also used where engraving jobs are small and infrequent, making the installation of an engraving machine uneconomical. For such work a small, high speed portable grinder is used, of the type that can readily be held in the hand. The manufacturer of this tool provides a suitable selection of burr-type engraving tools, especially designed for use in the grinder.

Keller Pneumatic Tools. The Keller Tool Co., Grand Haven, Mich., now has available a catalog featuring large, easily read type and an abundance of actual photographs of both air tools and their practical on-the-job applications. Capacity and specification tables concerning each tool are presented in easily understood form together with concise ordering instructions.

Moreover, the catalog covers 14 new tools developed during the war, including an air powered sawing and filing tool, an impact wrench, and a lightweight air hoist in 300-lb., $\frac{1}{4}$ -ton, and $\frac{1}{2}$ -ton capacities. A novel presentation and introduction to the catalog is made in the form of a mite-size letter accompanying each book. Copy of the catalog is available

free to individuals addressing requests on their company letterheads.

"A Machine of 1000 Production Uses" is the title of an eight-page bulletin issued by the Cochrane-Bly Co., Rochester 6, N. Y., illustrating and describing the Cochrane-Bly Universal Vertical Miller-Shaper and its application to many jobs, including the profiling, planing, shaping, filing, and scribing of dies; complete machining of forming tools; shaping, milling, boring, and drilling of jigs, and so on. Complete specifications of the machine are also provided in the bulletin, copy of which is available free upon request.



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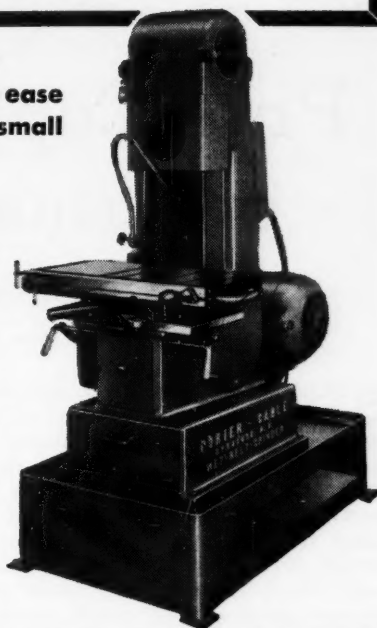
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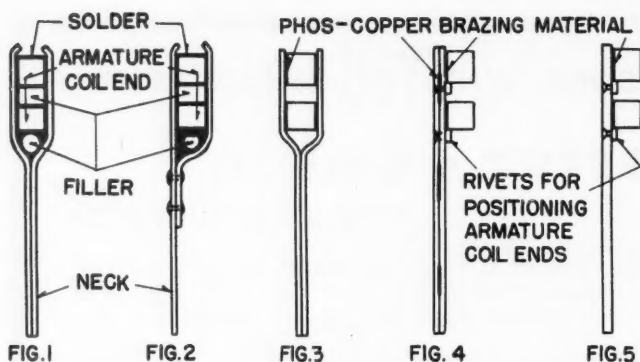


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Figs. 1 - 5—Construction Details for D.C. Generator and Motor Commutator Necks. 1—Std. Double Thickness Open Neck with Soldered Joint. 2—Std. Single Thickness Open Neck with Soldered Joint. 3—Std. Double Thickness Open Neck with Brazed Joint. 4—Modified Double Thickness Neck with Brazed Joint. 5—Std. Single Thickness Neck with Brazed Joint.

Phos-Copper Brazing of Armature Coils

By C. LYNN

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

SOLDER has been universally used for making the connections between armature coils and commutator necks and between armature cross connections and armature coils on direct current motors and generators since the development of d. c. machines. Solder has been used because soldered joints are easily made and provide good contact when correctly made. Until very recently, no other commercially satisfactory means had been developed for making these joints.

However, soldered joints have three fundamental imperfections; (a) the joint is relatively weak mechanically, the strength decreasing very rapidly with increasing temperature due to the nature of the material, (b) the joints will not stand high temperatures since ordinary solder (50-

50 solder) melts at approx. 183 deg. C. and (c) there is no known way of telling whether a good soldered joint has been made.

On some machines and on practically all machines with Class "B" insulation, which includes all railway equipment, these joints have been made with pure tin instead of solder on account of the higher temperatures at which the machines operate. Since tin melts at 232 deg. C., higher operating temperatures can be employed when it is used.

After our country's entry into the war, a drive was made to conserve tin on account of its scarcity and Westinghouse started developing a brazed type of joint for these connections. Efforts made in years past to develop a method that was commercially practical for large scale pro-

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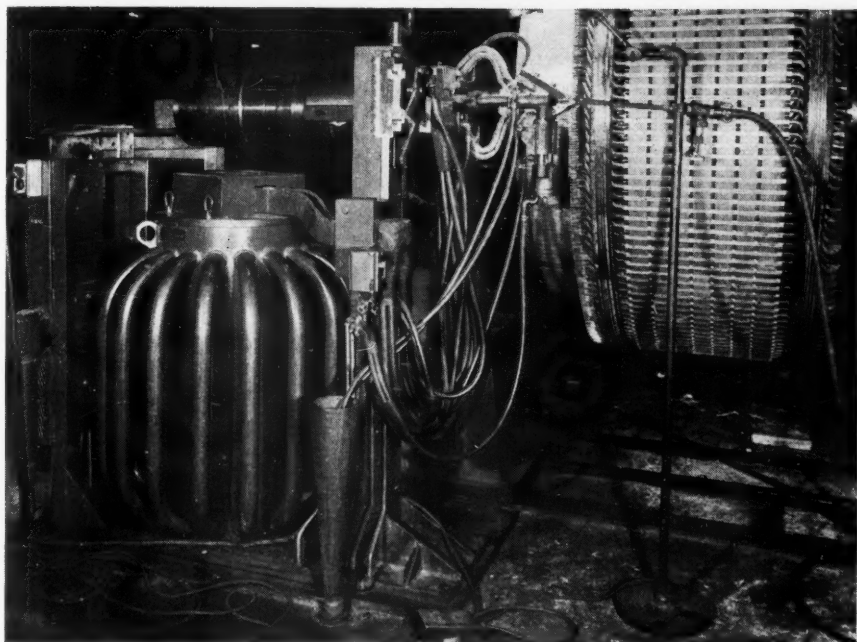


Fig. 6—Brazing Armature Coils to Commutator Necks, using Phos-Copper and Tong Method.

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duction were never successful. Brazing with a flame is impractical on account of the spread or heat and accompanying damage to adjacent parts, particularly to the insulation. This has, however, now been accomplished for commutators with open type necks.

Figures 1, 2, 3, 4, and 5 show the various types of commutator necks employed on Westinghouse machines. Figs. 1 and 2 show standard types of construction used on soldered joints; Fig. 1 is most commonly used. Note that in the case of Fig. 1 the neck is made of a double thickness of copper with the outer periphery opened to form a space for the insertion of the armature coil ends. The neck may be of two pieces, riveted or spot welded together, or one piece folded to two thicknesses.

The second type, shown in Fig. 2, is also used when the commutator bar pitch is very thin, in which case only a single thickness of neck material is used, with an additional piece riveted on to form an opening at the outer periphery for the armature coil ends. The soldering of these types of necks is similar and it is necessary to use filler pieces of copper of the same thickness as the armature coil ends between the top and bottom armature conductors and in the opening below the bottom armature coil end.

Fig. 3 shows a type of brazed joint in which the armature coil ends are simply brazed to the standard type of neck, as used with the soldered joint. However, the copper filler pieces have been omitted below the bottom conductor coil end and between the top and bottom coil end. In brazing this

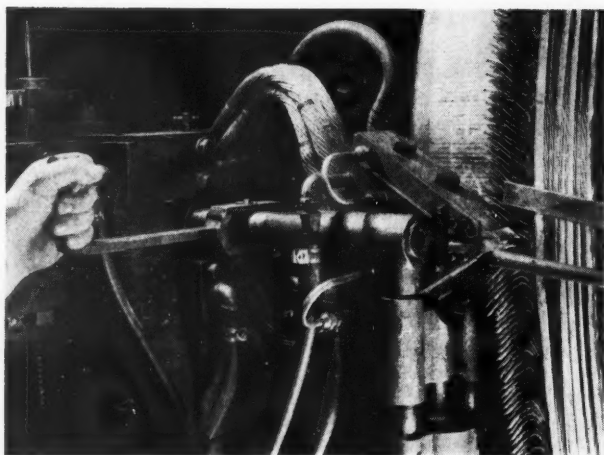


Fig. 7—Tong Brazing with Phos - Copper Showing Close-Up of Head in Operation

type of joint, thin strips of phos-copper* approx. 0.015 inch thick, with a width equal to approximately half the width of the neck in a direction parallel to the shaft, are inserted between each side of the armature coil ends and the neck. Heat from a brazing transformer is then applied with pressure to the joint by means of carbon tipped brazing tongs.

After the phos-copper has melted (815 deg C.) and has flowed over the surface to be brazed, the current is stopped but the pressure is maintained till the joint cools. In normal production, a blast of compressed air is applied directly to the joint whenever current is not flowing. Thus, when the circuit is interrupted at the end of the melting period, this air tends to rapidly cool the brazed joint. An improvement that has been developed consists of blowing a small stream of air in a radially-inward direction against and between the armature conductors just back of the commutator necks. This keeps the conductor cool and eliminates damage to insulation.

* Phos-copper is an alloy of phosphorus and copper and is used as a brazing material for copper and copper base alloys. It has a low melting point and is free-flowing.

In making a joint in this manner it is possible to braze armature coils with Class "A" insulation without damage to the insulation. Since the armature conductors are brazed solidly to the commutator necks, no spacers are necessary between conductors or below the bottom, since it is not necessary to fill this space with brazing material. It should be pointed out that the resistance of a brazed joint is somewhat higher than that of a "good" soldered joint due to the inherent higher resistance of the material itself. However, since the resistance of either joint is a few micro-ohms only, the value is of no consequence.

Figure 4 shows another type of brazed joint, similar to the type shown in Fig. 5. In Fig. 4 two pieces of copper are brazed together to form the neck. This method is used where the neck material has already been made, or where the necks have been partially formed in the shape shown in Fig. 1, and have then been re-formed to that of Fig. 4.

In Fig. 5, the neck itself is made of one piece of copper, with thickness equal to the total thickness of the soldered-type neck shown in Figs. 1 or 2. This thickness, varies, of course, with the design and current rating of the machine. In this construction small copper rivets are inserted in the neck (in the correct position before the necks are attached to the commutator bars) to properly locate the ends of

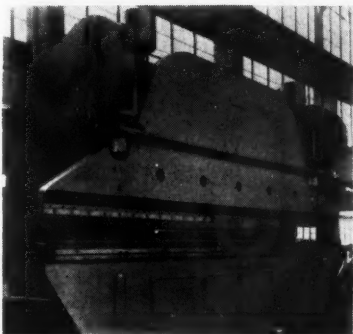
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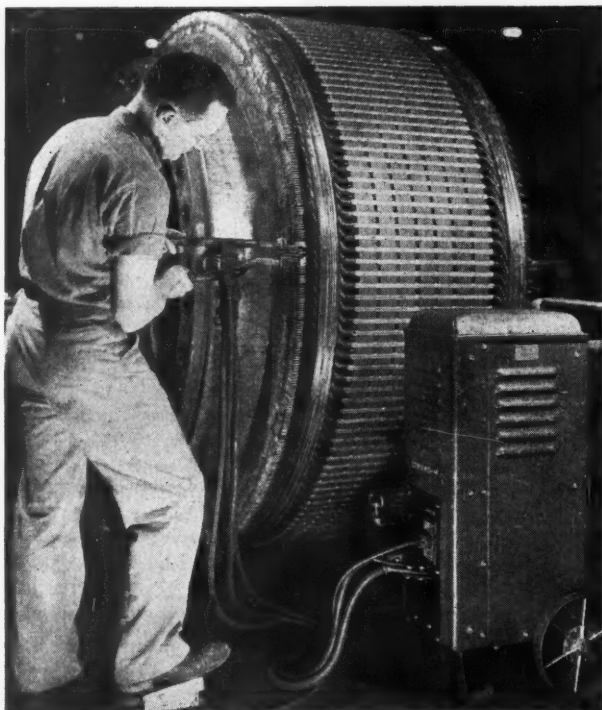


Fig. 8 — Portable Tong Brazing Outfit being used to Join Armature Coils to Necks.

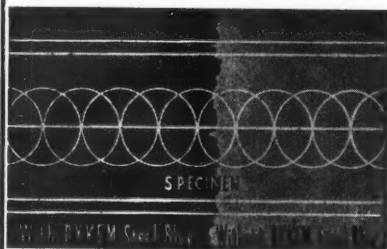
the armature coils in a radial position for brazing.

It is also possible to omit these small rivets and simply locate the position of the armature coil ends radially by reference to the outer periphery of the armature iron, through use of a straight edge. Small pieces

slot machined in the bar. Before brazing was used for attaching the necks in the bars, the necks were held in position in the slot in the bars by soldering and riveting with counter-sunk rivets. For the past three and a half years Westinghouse has eliminated this riveting and soldering and has

of phos-copper (approx. 0.015 inch thick and about half the area of the overlapping of an armature coil end on the neck) are spot welded to the neck to prelocate the brazing material. This method provides the exact amount of brazing material necessary for brazing the joint. Too little or too much phos-copper brazing material results in an inferior joint.

After the necks have been prepared in this manner, they are brazed into a



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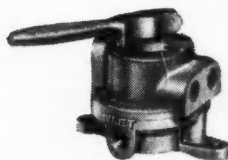
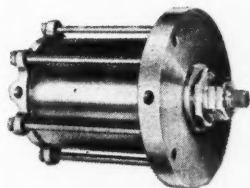
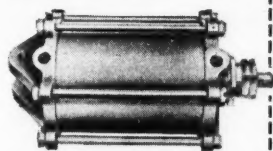


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simply brazed the necks into the slots.

Tong brazing with phos-copper is well suited to making multiple-joints as encountered on commutator necks and armature coil-ends, because it does not require a bright surface for the work. Flux, which may cause damage to adjacent insulation, cause corrosion of the metal and peeling of varnish and paint, is not needed. Even copper which has been tinned or soldered can be brazed, if phos-copper brazing material is used.

At room temperatures, the phos-copper joint is approximately four times as strong as a perfectly-formed soldered joint, using pure tin. With an increase in temperature, the phos-copper joint becomes many times stronger than a tinned or soldered joint. Then, too, the brazed joint can be taken apart when desired by applying heat through use of the tong and separating the pieces while hot.

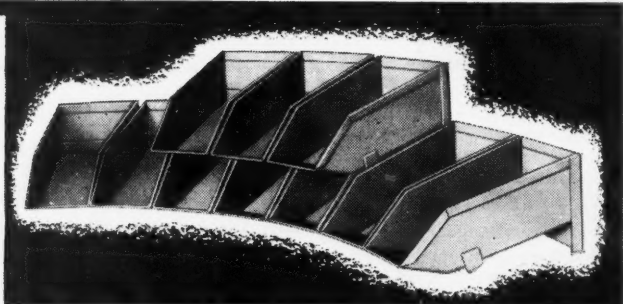
In making armature coils for sold-

ered joints, the ends of the coils are pretinned after the coils are formed and before they are treated in varnish. After the coils have been treated in varnish, the varnish is removed from the ends by dipping into a pot of melted tin or solder. When soldering with pure tin, the pretinning must be done with pure tin also so as to avoid contaminating the final pure tin joint with lead. It is absolutely necessary to pretin the ends of the armature coils before making a soldered joint. It is also necessary to pretin the open ends of the commutator necks before soldering the armature coils to the necks.

When brazing is used, no tinning of any kind is necessary on the open end of the commutator necks. The armature coils, however, are pretinned and retinned in exactly the same manner when the coils are to be brazed as when they are to be soldered, except that pure tin need not be used. At-

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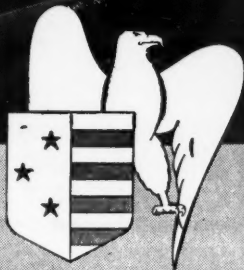
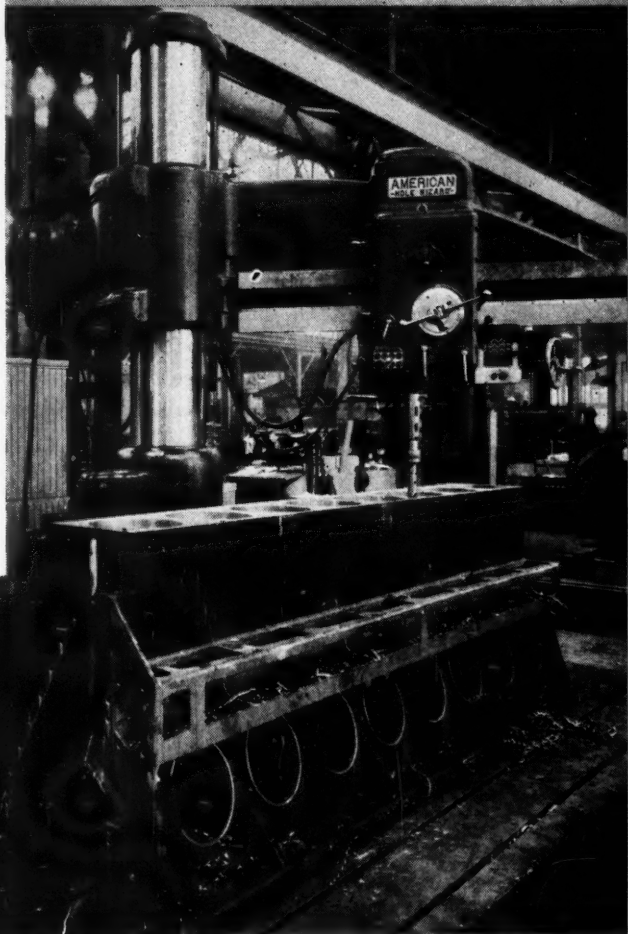
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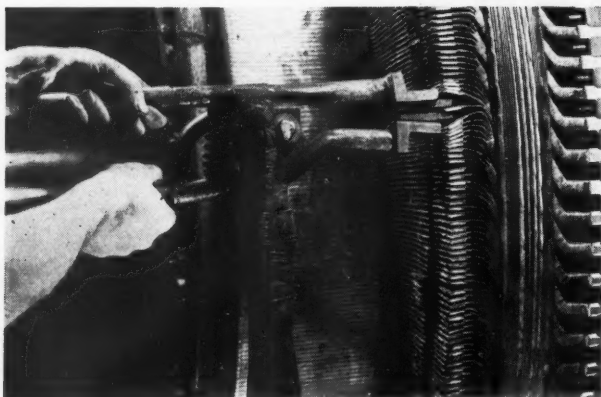


Fig. 9—Close-Up of Portable Brazing Tongs in Action.

tempts to eliminate pretinning and retinning of the coil ends by various other methods for removing varnish from the coil ends such as sand blasting, acid treatment, and so on, have uncovered no method that compares, in ease and cheapness, to that of removing the varnish by tinning.

armature coil-ends and commutator-neck joints which have previously been soldered. In such cases it is only necessary to split the joints, heat the material, remove (with a rag or other means) the bulk of the solder from the copper, place pieces of thin phos-copper strips in the joint in the

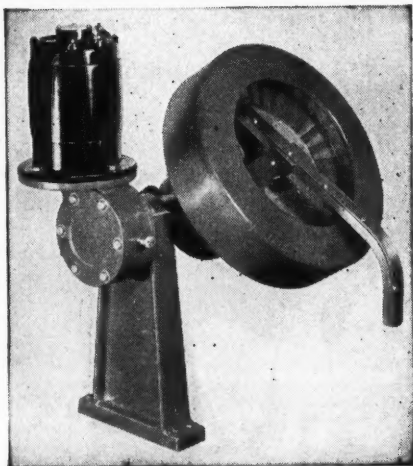
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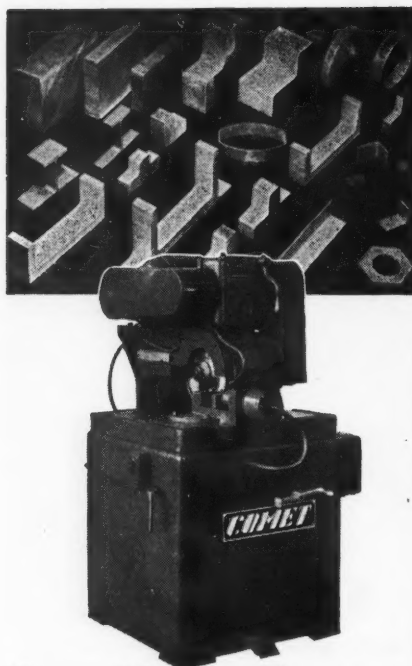
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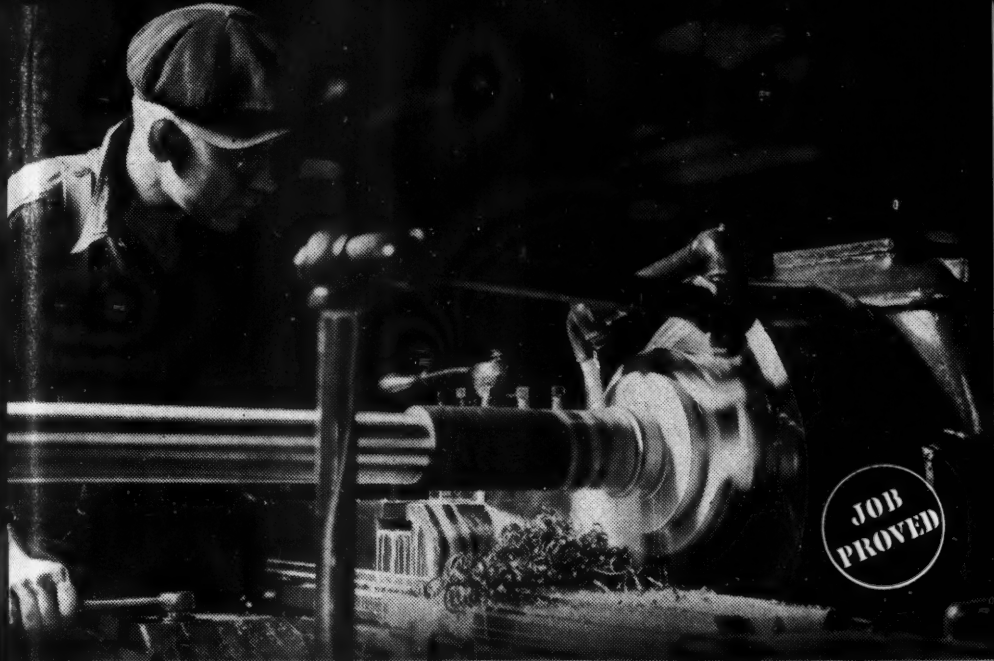
manner mentioned for the brazing of the type shown in Fig. 1 and braze the joint.

Westinghouse is continuing experiments and development work on brazing technique in order to improve brazed joints and cut down the time required to make them. At present, it takes somewhat longer to make brazed joints than soldered joints, but it is hoped that eventually, it will be possible to make brazed joints as quickly as soldered joints. Westinghouse tried applying phos-copper in other forms than by spot facing thin strips to the necks. In one such method the phos-copper was atomized and sprayed onto the work.

In Westinghouse shops, brazing stands are used for work on the commutator necks. These stands are mounted on wheels, are adjustable in height and spacing, and support the rotor by means of the shaft. This arrangement allows the armature to be placed in correct relationship to the brazing head and permits easy turning of the rotor so that the joints are positioned correctly in successive order. The brazing head itself consists of air-operated "tongs" with parallel jaws which can be moved inward or outward, in a radial direction along the commutator neck, for brazing the outer or inner armature coil ends. They can also be moved in an axial direction to permit insertion of the carbon jaw tips that are used for gripping the joints to be brazed.

The carbon tips are thin and tapered and each is connected to the brazing transformer through suitable flexible leads. These tips can be shaped to any size required, depending upon space available between necks and upon the sizes of necks and coil ends. It is necessary to bend adjacent necks slightly away from the neck that is being brazed.

The neck in process lies in a horizontal position. The carbons are posi-



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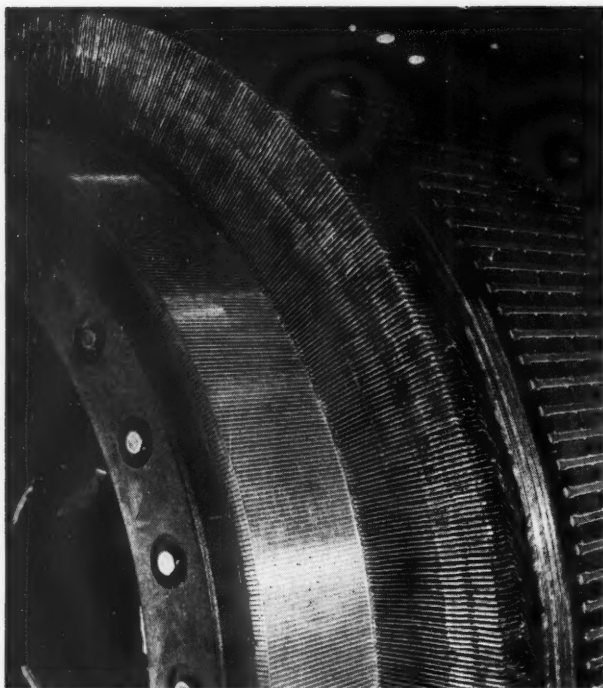


Fig. 10—Section of Completed Armature after Coil - Neck Joints have been Brazed with Phos-Copper.

tioned above and below the joint, then a foot-lever pressed which admits air to a hydraulic cylinder and presses the carbons together. Current is applied by further travel of the foot-lever. A small, continuous stream of compressed air, blowing from a fixed orifice adjusted to the correct location for the particular armature, blows against the

blows through a small orifice near the tip of the jaws, cooling the joint quite rapidly. In a very few seconds the phos-copper will have hardened and the jaws can be released. See Fig. 6 and 7.

To break one of these joints the process is reversed. The joint is heated with the tong and as soon as the

armature coil just back of the neck, keeping it cool and eliminating damage to insulation.

When the pre-labeled phos-copper previously spot welded to the neck melts and flows out over the joint to be brazed, the operator releases the switch, stopping the current flow. However, he still maintains pressure on the joint. When the circuit is interrupted, an additional air blast

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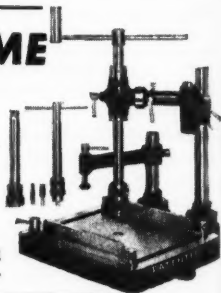
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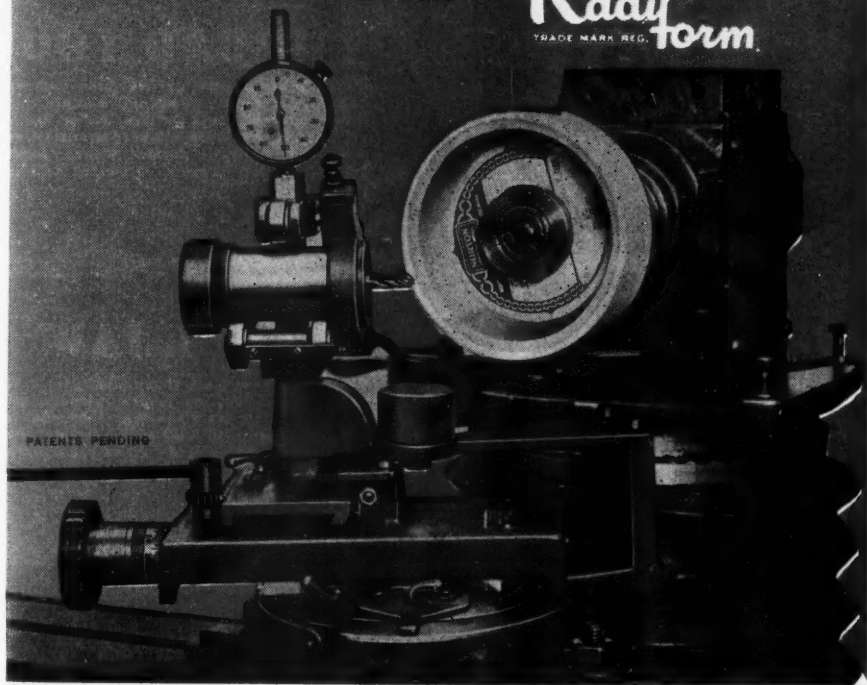


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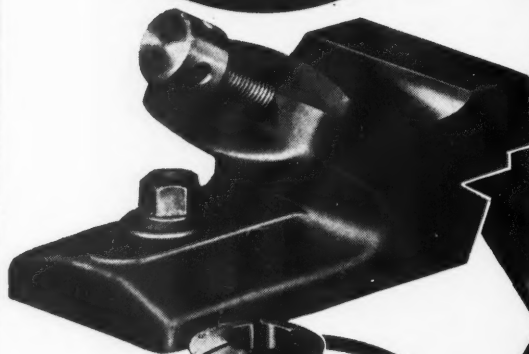
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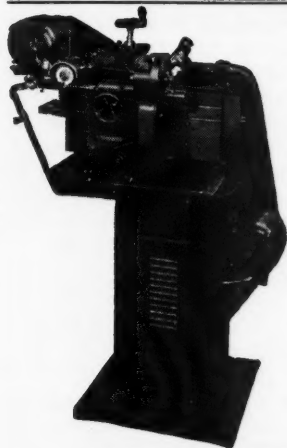
brazing material starts to flow, the current and pressure are released and the two pieces are knocked apart. It is possible to make and remake a joint 3 or 4 times without brazing material. Brazed joints made as replacements for soldered joints, using the type of construction shown in Fig. 3, are somewhat more difficult to open. Those made as shown in Fig. 4 and 5 are very easily opened. Fig. 10 shows the commutator end of a rather large armature on which the armature coils and commutator necks have been phosphor-copper brazed, using the latest type of neck as shown in Fig. 5.

For use in the field or in manufacturing and repair shops such elaborate equipment is, of course, neither needed nor justified. A portable type of brazing transformer equipment, with adjustments for varying the value of the brazing current, is satisfactory. Such portable equipment is available and includes a set of brazing tongs with

carbon tips attached to the jaws. Fig. 8 shows the equipment in use, while Fig. 9 shows a closeup of brazing with the tongs.

Approximately 125 to 250 joints can be brazed with one set of carbon tips. Since the tips are small and inexpensive, the cost of carbon tip replacement is low. The portable brazing set not only includes a set of brazing tongs but also has connections for air supply, with suitable valves. These magnetic valves operate automatically in the proper sequence and supply the air to the joints being brazed whenever the current supply is opened. All that is necessary is to connect an air supply to the connection provided on the transformer case. This equipment is mounted on wheels to make it readily portable.

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are usually spaced approximately $2\frac{1}{2}$ inches apart around the armature periphery, and are normally located at the rear of the machine. The standard method of joining cross connections to armature coil clips has been by riveting and soldering. When using brazed joints for these connections, the riveting can be omitted. The cross connector can be brazed to the armature clip in the same manner used for commutator necks. In factory production, the brazing material, in the form of thin strips, is attached to the armature coil clips by means of spot welding before winding.

Phos-copper brazing can be applied not only to commutator neck and cross connections but to many other jobs as well. It can be used on stators of a.c. machines, on induction regulators, transformers, etc. It is not necessary to prelocate the brazing strip material since it can be fed to the work in the form of small rods about $\frac{1}{8}$ -inch in diameter. In d. c. machines, Westinghouse has used phos-copper brazed joints for attaching cross connection clips to armature coils themselves for the past seventeen years. Never has there been a single failure of this brazed joint. Similarly on the stators of d. c. machines, phos-copper brazing on leads from brushholder brackets to brushholder cross connection rings, have been used for fifteen years without any failures.

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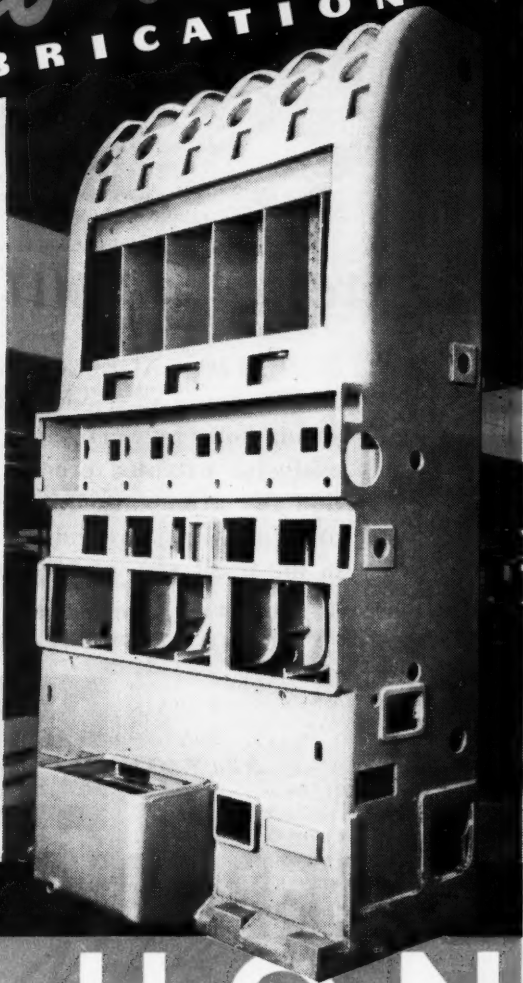
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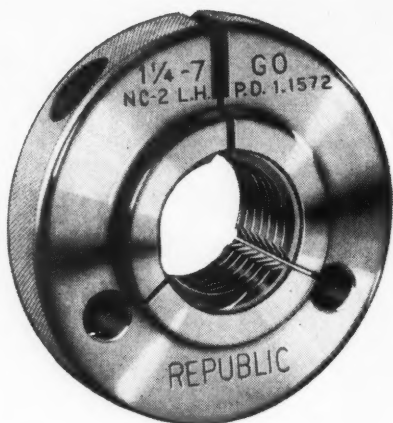
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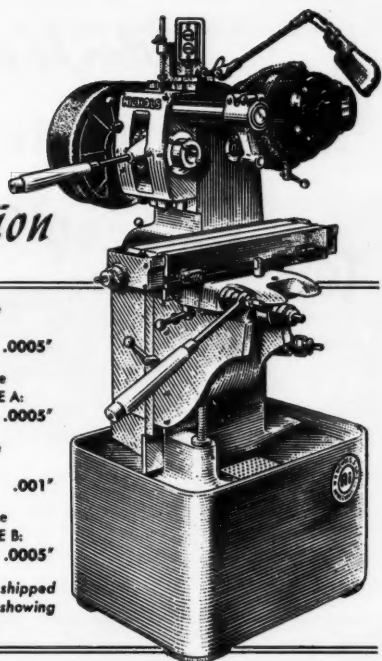


REPUBLIC

REPUBLIC GAGE

DETROIT 21, MICHIGAN

Puts the **PRECISE** *in Precision*



Spindle Taper Runout: Allowable Error	.00015"	Squareness of Head Slide to Top of Knee: Allowable Error	.0005"
Spindle Runout on 8" Mandrel: Allowable Error	.001" F.I.R.	Parallelism of Head & Knee Slides on Column, PLANE A: Allowable Error	.0005"
Parallelism of Spindle to Table: With Error at Spindle Nose	.0000"	Squareness of Head Slide to Top of Saddle: Allowable Error	.001"
Allowable Error 8" from Spindle Nose	-.0005"	Parallelism of Head & Knee Slides on Column, PLANE B: Allowable Error	.0005"
Parallelism of Spindle to Top of Knee: Allowable Error	.001"	Every Nichols Miller is shipped with an inspection sheet showing these tolerances or better.	
Right Angularity of Table to Spindle on 20° TRAM: Allowable Error	.001"		

Everything about the Nichols Miller has been done to make it as precise as precision can be. Built-in Accuracy . . . Rigidity . . . Speed — all are there ready to give you speed with precision on a single piece or in mass quantity — with Versatility limited only by the imagination of the tool engineer or the capacity of the machine itself.

CONDENSED SPECIFICATIONS

Table Working Surface	63 1/4" x 21" or 30"
Longitudinal Travel (screw or lever)	10" or 19"
Transverse Travel (screw or lever)	7"
Vertical Travel — Knee	13 1/2"
Rise and Fall of Spindle	4 1/2"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1250 lbs.

✓ RIGIDITY

Carefully designed, uniform-walled, box-type castings take full advantage of cast iron's strength.

✓ VERSATILITY

A "basic" machine easily tooled to handle tool room or production milling within its capacity. Mounting the work in the spindle permits Second Operation boring and facing.

✓ SPEED

For example, the Nichols Miller can turn out 1000 cuts an hour on one setup. Then, after a quick tool change, it can be ready for another job.



Send for your free copy of
"The Miller That Uses Its Head"

THE *Nichols* MILLER

MANUFACTURED BY W. H. NICHOLS & SONS, WALTHAM, MASSACHUSETTS
NATIONAL DISTRIBUTORS: NICHOLS-MORRIS CORP., 44-A CHURCH ST., NEW YORK 7, N. Y.

then he said to himself:

Tell the people what's cookin'



Master of the picturesque is Fiorello H. LaGuardia. Asked why he chose a radio spot after relinquishing the Mayor spot in New York . . . his simple answer:

"People ought to be told what's going on."

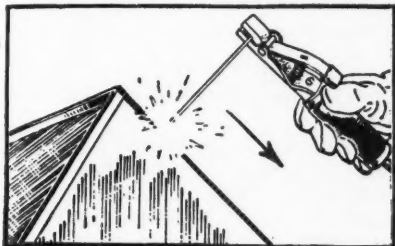
And, there's plenty going on in industry that people can be told about:

. . . new designs . . . new techniques that give the people more value for less money. For example:



**LOOK, MR. LA GUARDIA, how manufacturers
are stepping out in front with the world's
leading welding electrode:**

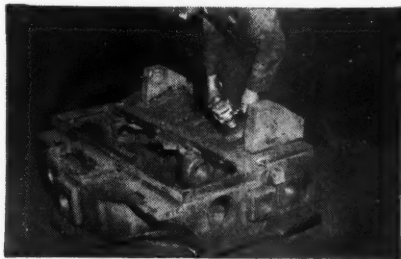
"Cooking" with Fleetweld...



Going downgrade 33% faster. This fabricator was welding corner joints in 18 gauge galvanized steel at an arc speed of 30" per min. At the suggestion of the Lincoln Engineer, he started tilting the joint 45° and welding downhill with "Fleetweld 35". Increased speed to 40" per min. . . . 33% faster.



Jigging up for 16% lower cost. Use of jigs to improve fit-up of parts and positioners to get downhand welding usually permits use of larger electrodes. In welding of this tapping machine frame, electrode size went from 5/32" to 3/16" "Fleetweld 7". Welding cost went down 16%.



Using "arc force" to boost speed 20%. Fillet welds in flat and horizontal positions are being made with 1/4" "Fleetweld 11" and "Fleet-Fillet" Technique at arc speeds of 12" per min. where former method gave 10" per min. This mining machine transmission case is a typical application. Full details in Bul. 444.



The sign of good "cooking." When you see 3 DOTS on an electrode, you know you have genuine "Fleetweld" . . . the world's leader for low cost, speed and quality. New, handy pocket manual giving procedures for all kinds of jobs free on request. Ask for Bul. 437.

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America's greatest natural recourse
ARC WELDING

Bearings Without Oil

By LELAND B. WATSON

Sales Manager, Paramount Oilless Bearing Company, Inc.

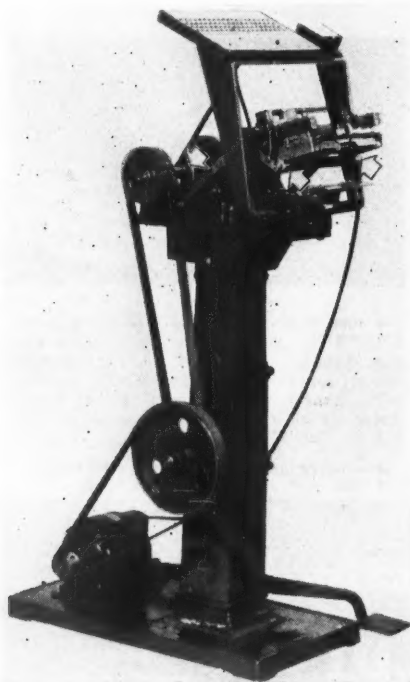
WHEN in the early stages of human history it was discovered that transportation problems could be simplified by the use of two circular members made from wood, stone or other substantial material and held together by a horizontal member, one problem was on the way to a solution but another was developed—the need for lubrication. The lubrication problem has been with us ever since, and

has developed from a simple problem to a science.

In the crude mechanical units of an earlier day shafts were revolved in holes in the supporting members, but eventually it became evident that time and grief could be saved if the holes were first lined with removable sleeves, or bearings. The first shafts were made of wood, as were the bearings, but with the development of the art of metal working and the adoption of metal for shafts, metals of various kinds were also adopted for use in bearings.

Within the past 60 years bearings of every conceivable description have been developed to reduce friction and noise and to assist in increasing production. Materials used for bearing construction are many and varied, the most important including babbitt, bronze, cast iron, steel (for balls and rollers), graphite, rubber, plastics, moulded fibres, and wood.

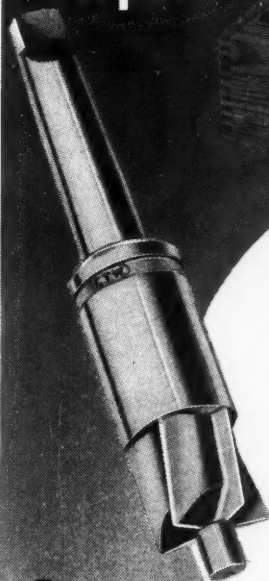
Certain types of bearings are self-lubricating and thus are termed "oilless", which is a misnomer. Bearings of the ordinary type of construction, unless grease-sealed, require manual oiling at regular intervals to protect both shaft and bearings surfaces. The selection of a particular type of bearing for a given job is governed by the



Wood bearings are used in this automatic marking machine to avoid oil-drip which might damage work in process. (Photo courtesy Markem Machine Company.)

Continental COUNTERBORE SETS

A Size For Every Purpose



THE indestructible drive and rigid, yet simple, construction of the Continental Interchangeable Counterbore assure long dependable service.



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Division of Ex-Cel-O Corporation
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High Speed Steel
Tool Bits

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Tools

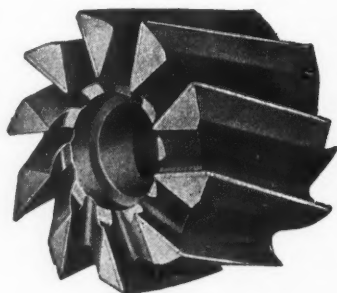
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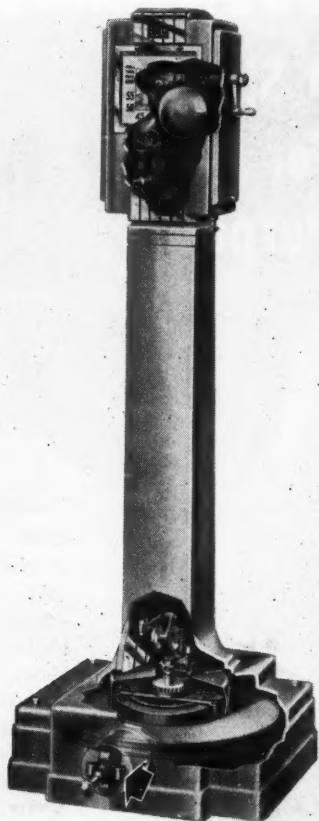
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factors involved in the operating conditions—and these are many.

The factors that must be considered in the selection of a bearing for a given task are primary considerations



John Wood (Bennett Pumps Division) Service Station Tire Inflator, equipped with wood roller bearings to meet conditions of dust and moisture.

when one attempts to ascertain the reasons for the failure of that bearing, and usually consist of the load, operating speeds, thrust actions, exterior shaft conditions, possibility of eventual misalignment, dirt and dust, chemical and physical changes, pres-

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GREEN CARBOLITE
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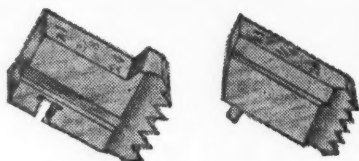
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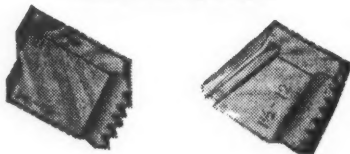
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ence of acids or alkalis, or both, and the presence of water or steam or other conditions of moisture.

To begin with, there may be an error in the analysis of operating conditions by the engineers, and the bearing selected for the job may not be capable of meeting the conditions of the task. However, in most cases failure of a bearing in service is due merely to lack of regular maintenance care.

To serve its purpose, the bearing

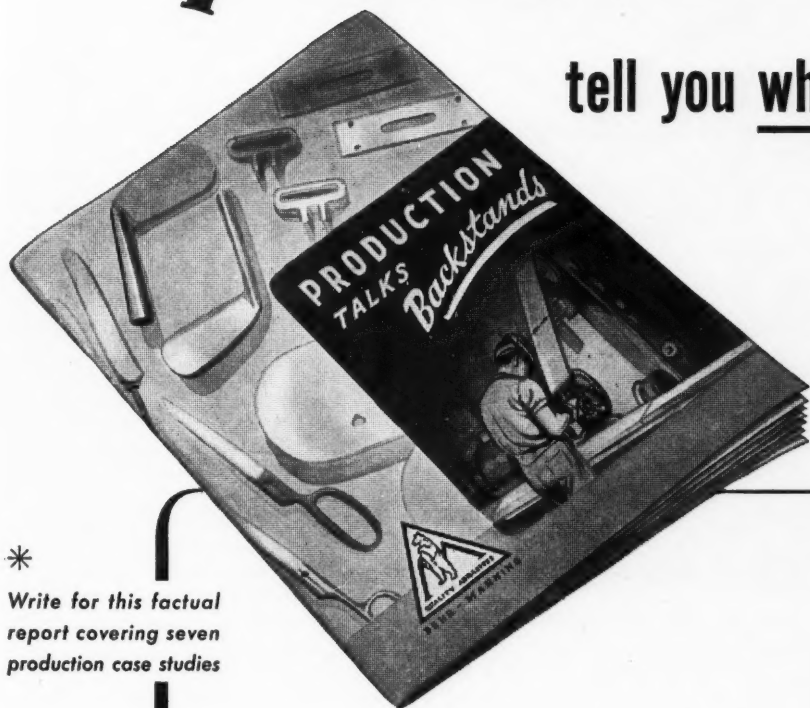


A wood block-type bearing, indicated by the arrows, is used in this Whittin winding machine to avoid possibility of drip.

must be lubricated by one means or another. Thus the lubricant has one primary function; to add to the life of the bearing and the part that is supported by it. To meet conditions of load and speed, lubricants are made in a wide variety of grades and consistencies. Lubricants of the ordinary type have a tendency to lose their viscosity when subjected to heat, and if the lubricant is to be subjected to high operating speeds, unless the in-

7 Field Engineers

tell you why*



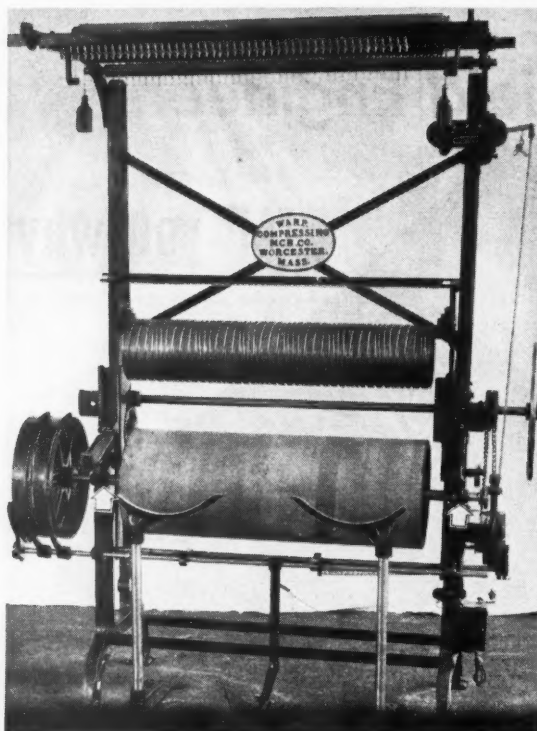
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Easily the greatest current development in coated abrasive engineering is the conversion of grinding and finishing methods from shop-coated set-up wheels to factory-coated abrasive belts through the use of idler backstands and cushioned work wheels. Truly, "production talks backstands"!

Here is a booklet for production men that answers the question, "Can backstands boost our production, too?" Factually written from field engineers' case reports on backstand installations in seven diversified industries, it permits accurate appraisal of backstand adaptability by direct comparison.

Production men recognizing comparable backstand operations in this booklet may rightly expect equivalent success with backstands in their own plants.

BEHR-MANNING (DIVISION OF NORTON COMPANY) **TROY, N.Y.**
Quality Coated Abrasives Since 1872



The two wood bearings (indicated by arrow) in this Warp Compressing Machine Co. spooler support a load of over 200 pounds and eliminate oil-drip.

For certain types of service where extreme accuracy is not an important factor, the wood bearing has certain advantages. A solid metal bearing will not absorb oil; thus to make the bearing effective a continuous supply of oil must be maintained in order to maintain a film of lubricant between the running part and its bearing. Wood, on the other hand, can be impregnated with oil in such manner that the oil is available as needed to lubricate the shaft or other running part.

The same natural properties of the wood which make it possible for Nature to force the sap—the life-

blood of the tree—through the trunk and branches and out to the tip-ends of the leaves also make it possible to impregnate the wood with oil in such manner as to provide the absorption, exudation, reabsorption and no-drip qualities for which, in many types of

stallation is properly enclosed and packed, the lubricant is likely to run out of the bearing and thus be wasted. The result is, of course, a burnt-out bearing and scored shaft, with attendant expense for replacements and loss of production while repairs are made.



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Writing about a troublesome turret-lathe job on 3145 steel, the company states: "With Cimcool, we were able to cut a 1 1/2 inch diameter, 5 pitch thread with a finish far superior to any cut with oils . . . and more than doubled our chaser life between grinds."

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THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.



CIMCOOL

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installations, wood bearings have been found highly advantageous. No bearing can properly function unless some means is employed whereby a lubricant or anti-friction agent can be supplied to the contacting surface. Wood bearings, properly conditioned, can be made to supply their own lubricants in constant and adequate quantities.

Where the manual method of supplying lubricant to bearings is employed, more often than not dust and dirt find their way to the shaft and bearing surfaces. This fact in itself causes bearings and shafts to wear out in short order. The application of lubricant, particularly in the case of graphited oils, also carries with it the possibility that some of the lubricant may be spilled on goods in process, and the danger of spatter and drip is always present. Here the wood bearing has a distinct advantage, because the wood is impregnated with lubricant before

it is assembled to the machine, and in practically all cases will serve indefinitely without the necessity of supplying additional oil.

A manufacturer of baby carriages, in testing wood bearings for possible use on the carriage wheels, saturated a set of bearings and then threw fine emery dust on the shaft and bearing surfaces. After tests which amounted to the equivalent of two years of normal baby carriage use he found to his utter amazement that the shaft had worn 0.003 inch while the bearings had worn only 0.0005 inch. The wood bearing had adapted itself to the presence of emery dust, but the steel shaft couldn't stand the abuse.

For most applications of the type for which wood bearings are suitable, such bearings will carry a lifetime reserve of oil. Further; they may be stored for years without losing their self-oiling qualities. They are also non-conductors of heat and electricity,

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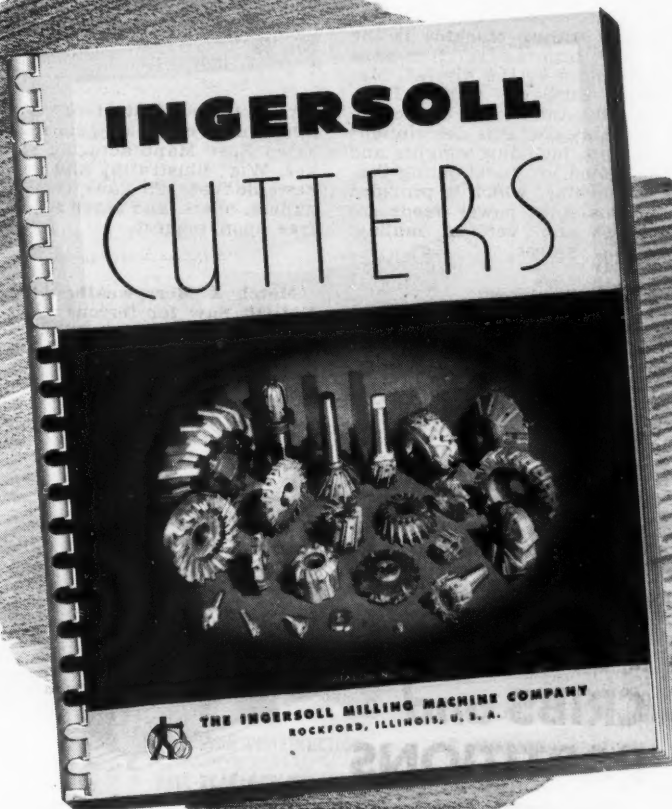
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which is a distinct advantage in certain instances. Finally, impregnated wood bearings can be machined in every conceivable shape.

Armor Bench Milling Machine is the subject of an informative four-page brochure announced by the Aircraft Machinery Corp., Burbank, Calif. Illustrated in exact dynamic colors of the machine, the brochure contains descriptions and specifications, including weights and prices. Also listed are outstanding features of the machine, which is provided with 8 speeds and 32 power feeds for both horizontal and vertical milling. Copy free upon request.

Linley Vertical Milling and Jig Boring Machine, product of the Nichols-Morris Corp., 50 Church St., New York 7, N. Y., is the subject of illustrated literature compiled by this firm in English, Spanish, and Portuguese and now being offered free upon request.

"Emergency Cutting" is the title of a four-page bulletin released by the Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif., illustrating and describing the Victor Pack Type Emergency Flame Cutting Outfit for fire departments, rescue squads, state highway police, and industry. Copy of the bulletin is available free by requesting Form No. 69.

"For Better Protection" is the title of a mallpiece now being distributed by the Trico Fuse Manufacturing Co., Milwaukee, Wis., illustrating and describing renewable fuses, air guns, test clamps, fuse pullers, oilers, and other products. Copy free upon request.

Motch & Merryweather No. 00 Metal Cut-Off Saw for ferrous bars up to 1½ inches, non-ferrous bars up to 2 inches, and tubing and shapes up to 2½ inches is covered as to general features and specifications in an illustrated bulletin prepared by The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio. Copy free upon request.

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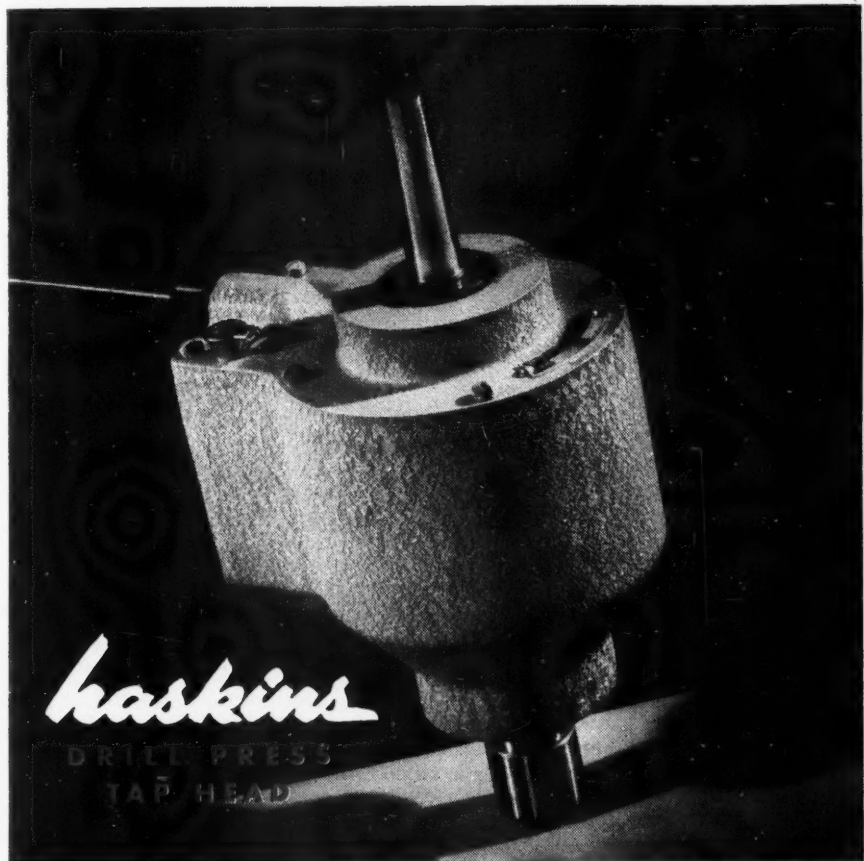
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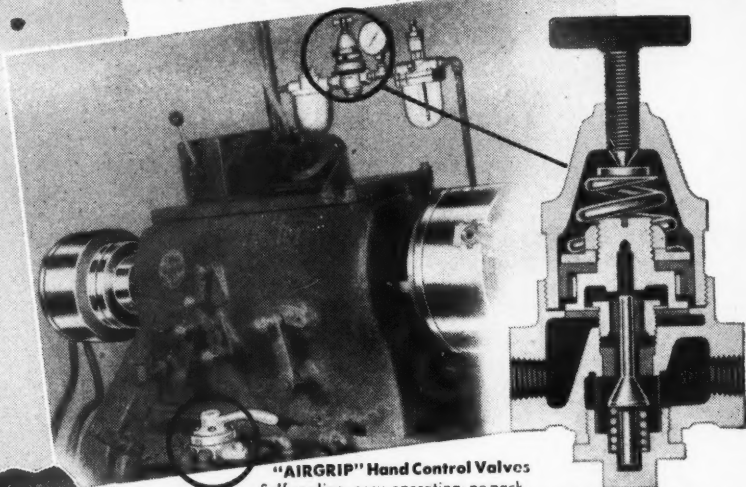


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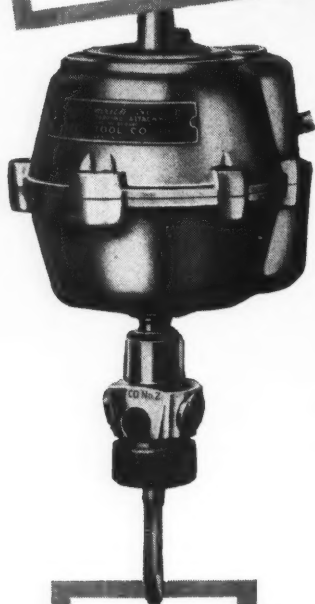


July, 1946

MODERN MACHINE SHOP 171

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Incentive Plans for Top Executives

By CLINTON DAVIDSON

President, Management Planning, Inc.

ONE of the most serious problems confronting American business today is that of insuring proper and adequate compensation to the men who bear the burden of administration and direction. The reason is not that stockholders are unwilling to pay salaries or bonuses commensurate with results, but rather that the income taxes are so high that most of the moneys so paid out would go to the tax collector instead of the executives for whom the "incentives" are intended.

Here is the way one large-scale owner voiced the problem: "Our company's sales," he said, "are at their highest point in our history. Wages and working conditions for production employees are likewise better than ever before. But salaries and other compensation paid to officers, directors and other high executives are the lowest, in terms of sales and net worth, that they have been since 1931.

"We have examined every possible avenue of correction—bonuses, profit sharing, issuance of stock, and the like, and every course brings us up against the blank wall of income taxes. To take a specific example, we have one man who earns \$50,000 now, and who is worth at least twice that much to the company. But if his earnings doubled, his actual net increase, after taxes, would be less than \$12,000 a year. We are extremely anxious to

find some way to pay him more, because he is seriously considering becoming a partner in a new and smaller concern. If he takes this step, his immediate earnings will be slightly less than they are now, but he stands to profit later on by the growth in the new company's net worth. If that happens, and he sells part or all of his holdings, he will have to pay only the 25 per cent capital gains tax on the amount realized as compared with a 77 per cent income tax on the increase when his compensation is raised from \$50,000 to \$100,000."

Here is another example which shows how tax developments have vitiated ownership's desire to give management a share in the profits of business. A company which is international in scope has paid its managers large and liberal bonuses for a score of years, these bonuses representing a percentage of earnings. As a result of this plan, the company's former executive vice-president and general manager, who retired a few years ago, accumulated a personal fortune of more than a million dollars out of these bonuses. His percentage bonus in a single prewar year often ran as high as \$200,000. Judged by such results, this particular company's bonus arrangement would seem to be ideal.

It was ideal in earlier days, but it

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BRONZE

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NEW CASTLE, PA.

almost defeats itself under today's personal income tax laws. For example, if this same general manager were to receive a \$200,000 bonus today, some \$148,000 would go for personal income taxes, leaving less than \$52,000 for himself. This sum is hardly sufficient to pay his personal expenses under the living scale which he had previously established, and it leaves little or nothing for savings in the future.

While the earnings-bonus plan still costs the company the same amount, the moment the general manager's compensation exceeds \$100,000, approximately 85 per cent of it is consumed by taxes—and the incentive wholly disappears from the company's incentive plan. Proportionate "let-downs" occur in the case of executives farther down the ladder. If the \$10,000-a-year man receives a salary increase or bonus sufficient to double his earnings, Uncle Sam takes \$4,028

of the increase. And the executive whose \$25,000 is doubled has to turn over \$15,589—more than half—to the tax collector. A similar jump, before the war, would have netted the executive more than \$18,000.

There are two solutions to this difficulty, and both of them are difficult. The first involves a reduction in personal income taxes—and Business, for its own good and that of the country as a whole, should be doing its utmost to "sell" Congress on a substantial cut in upper-bracket taxation. The second involves the acquirement of stock ownership by top managers, which is also a complex operation.

If, at the time the earnings-bonus plan described above was put into effect, the general manager could have bought a percentage of the company's stock comparable to the percentage of earnings he received as bonus, his income would have been

NEW LAMINATED TOP PLATE



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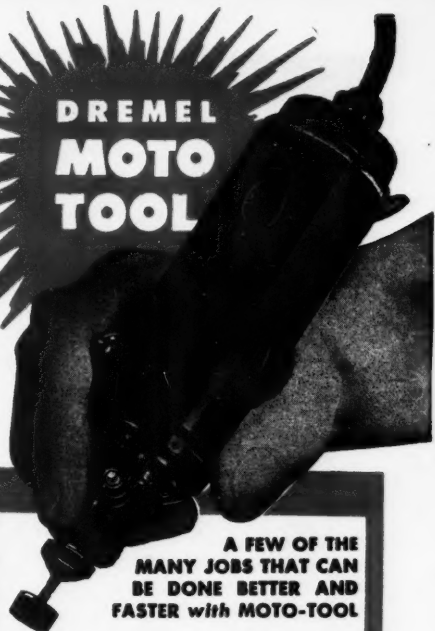
HANCHETT MANUFACTURING CO., Big Rapids, Michigan

A 'WAR VETERAN' with a distinguished Service Record

Long before Pearl Harbor, Dremel MOTO-TOOL won its spurs by the way it tackled tough jobs in tool rooms and machine shops, and on production lines. But when American industry swung its full strength into war production and our armed forces established far flung assembly and repair bases the already healthy demand for these mighty little midgets quadrupled.

Operators of Moto-Tools are ever discovering new jobs... new ways to save time and cut costs... with these pocket size machine shops. Girls quickly become proficient with them because a Moto-Tool weighs but 13 ounces, is shaped to fit the hand, has a balanced armature to prevent vibration. Thousands of Moto-Tools helped make the atomic bomb... were used to establish production records in plants such as General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Consolidated Aircraft, Northrup, Douglas, and many others.

DREMEL MOTO TOOL



**A FEW OF THE
MANY JOBS THAT CAN
BE DONE BETTER AND
FASTER with MOTO-TOOL**

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Model 2 Moto-Tool, complete with 23 accessories, in felt-lined hard wood case... **\$23.50.**
Model 2 Moto-Tool only, with one emery wheel point... **\$16.50.**

Model 2 Moto-Tool develops 27,000 rpm... the proper speed for clean, smooth, accurate work, and long life from points and cutters. It is sturdily built throughout and has a shock-proof bakelite housing and oil-less (oil sealed) bearings. Uses 110-120 volt AC or DC current. Patented automatic chuck lock pin makes removal of accessories easy. Pin disengages automatically... prevents accidental burning out of motor. Ask your Mill Supply salesman about Dremel Moto-Tools and accessories. If his firm does not carry them, write factory or nearest Dremel representative.

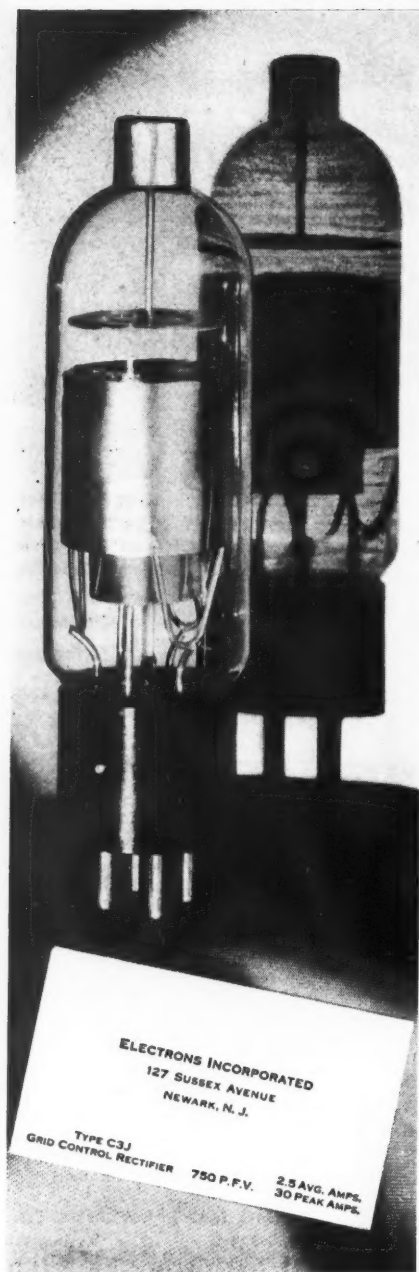
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Seattle, Wash.



reduced by present taxes, to be sure, but the assurance of future security for himself and family would have remained, through his stock ownership. And as long as the executive's future security remained, the major incentive would have continued to operate for the stockholder's benefit.

Obstacles to Acquiring Stock by Managers

There are two principal obstacles to the installation of such a stock-purchase plan. The first is the reluctance of stockholders—particularly in closely held corporations—to give up any part of their ownership interest. The second obstacle is the financial inability of the managers to buy a sufficiently large block of stock to make a manager's ownership interest worth while.

Overcoming the reluctance of shareholders to sell stock to management is basically a selling problem. Stockholders must be shown the intrinsic mutuality of interests. They must be "sold" on the benefits which accrue to all the owners from the efforts of the managers when the latter are impelled by the most powerful of incentives—part ownership in the business.

This selling job can not be done by management itself. Managers who approach owners in such a question are, per se, in a weak and self-serving position, and their arguments are too often regarded as special pleading. This is a task for the outside expert, who can succeed if he possesses the following specialized qualifications:

1. Unselfish interest and viewpoint.
2. Ability to gain the confidence of both parties.
3. Mature financial experience.
4. Sales experience, particularly in dealing with wealthy men.

Possession of these qualifications makes it relatively easy for the outside negotiator to "sell" a plan which

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Highly favored by operators because of their smooth, rigid, compact design. Particularly adapted to the use of carbide tools. Adjusting screw ground from solid AFTER hardening. Gradu-

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meets the respective needs of the managers and the shareholders. Even apparently hopeless situations eventually yield to a solution, and, in our experience, all but about 2 per cent of such cases can be satisfactorily resolved.

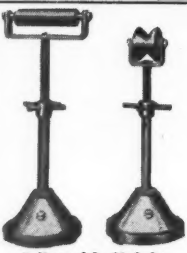
Solving the Managers' Inability to Purchase Stock

With respect to the second point—the financial inability of managers to buy adequate stock interest—it must not be assumed that the only solution is for the managers to have, or be able to borrow, all the cash necessary to buy such an interest outright. If this were the only way, less than one per cent of such arrangements could be consummated. In our varied experience with such situations, we have uncovered almost as many ways for individual managers to buy a stock interest as there are ways for a corporation to acquire additional


capital. For example, consider the following six solutions:

1. Stock purchase warrants.
2. Financing of the purchase by the corporation, with repurchase options at prices progressively increasing in proportion to the number of years the stock is held by the manager.
3. Stock purchase financed partly by dividends and bonus.
4. Direct purchases from controlling stockholders through part cash and part notes, with stock as collateral for notes.
5. Bank loans, endorsed by owners from whom stock is purchased.
6. Stock offered to manager at a price sufficiently lower than market price to enable him to do his own financing by using stock as bank collateral.


Serious tax problems are involved in each of the six methods outlined above, so none should be undertaken




Adjustable Height Roller Stands



Hand Trucks

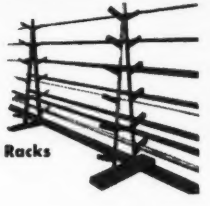


MATERIAL HANDLING EQUIPMENT




Steel Work and Welding Horses

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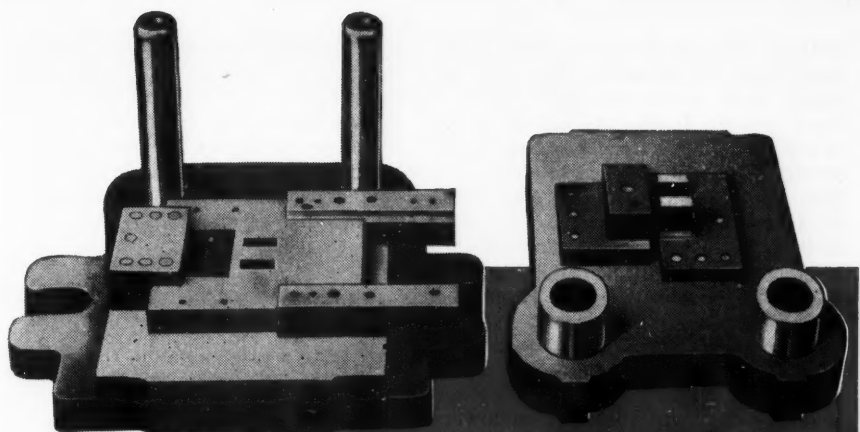
Steel Racks



Heavy Duty Steel Work and Welding Benches

MASSEY MACHINE COMPANY

769 PEARL STREET Inc. 1903 WATERTOWN, N. Y.



4½ Million Pieces
and this
CROMOVAN DIE
is still in use

The Facts of the case

This Cromovan Die and Punch is blanking 100,000 to 120,000 pieces of .025" silicon steel per grind . . . The original height of the die was 1¼ inches . . . now ⅝ inches high and still going, after having produced 4,500,000 pieces! For long service on high production jobs—use Cromovan Steel Dies.

Call **Flat-Steeling**
STEEL COMPANY

McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH
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without first securing tax advice. Despite this complication, the fact remains that where managers, out of their private funds, are unable to finance the purchase of sufficient blocks of stock, either the corporation or the stockholders must agree to assist them. Once again this is a selling job—persuading stockholders that if it is beneficial to have managers owning stock, it is likewise beneficial to help them own it!

As an incentive, stock ownership is far more effective than any mere profit-sharing device. The latter has a feast-or-famine quality that lowers its value in the eyes of management. Profits, as we have seen during the war years, can boom beyond the point where management itself can assume full credit for the rise, and in such periods the incidence of taxes is also great. Conversely, in a downward turn of the business cycle, sound and aggressive management

may conserve rather than build, but in any plan based on profits only, this contribution would be overlooked. Where incentives take the form of stock participation, the management which looks to the future as well as to the present will be well rewarded.

Acromatic Carbide and High Speed Cutting Tools. The Acromatic Tool Co., 640 E. State Fair St., Detroit 3, Mich., has issued a catalog listing various types of carbide and high speed cutting tools, including standard carbide-tipped reamers, shell reamers, twist drills, core drills, stub screw machine reamers, counter bores, milling cutters, saws, and turning tools. The catalog also contains several pages and illustrations of special carbide and high speed steel tools manufactured to blueprints or specifications. In addition, the catalog contains pertinent data on various types of special carbide and high speed tools, the flute sections of which are ground from solid stock. Copy of Catalog No. 46 free upon request.



SAVE HANDS WITH STRANDS

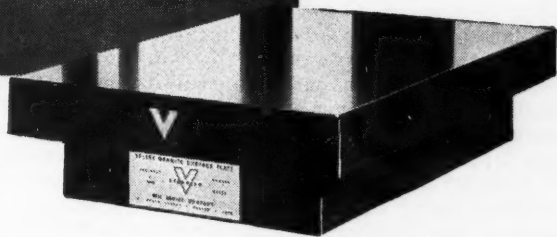
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Presses**

**Send for Enclosure
and
Sweep Safeguard
Circulars.**

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SAFETY ENGINEERS
611 West Lake Street Chicago 6, Ill.

VELSEY SURFACE PLATES ARE OLIVINE DIABASE

**HARDER AND
DENSER THAN
GRANITE**



Commercially known as black granite, *Olivine Diabase* is actually similar to basalt. It approaches the diamond in hardness (7:10). It is 15% heavier than granite and only 1/30th as absorptive.

Due to the hardness and density of VELSEY Surface Plates, they can be finished to extreme surface flatness and will last indefinitely with ordinary care.

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The structure of VELSEY Black Granite Surface Plates was stabilized ages ago in the bowels of the earth. Hence they are free from the internal stresses and strains inherent in man-made structures.

VELSEY Surface Plates do not sag and warp. They are non-freezing, non-magnetic, non-abrasive, rust-proof, shock-proof.

TWO SERIES

The Master Series of VELSEY Black Granite Surface Plates are finished to .00005" surface accuracy. Considerably lower in price, the Standard Series are finished to .0001" surface accuracy. Regular sizes in both series are 12" x 18", 18" x 24", and 24" x 36".

Special sizes are made to order. There is practically no limit to the possible dimensions.

Thousands of VELSEY Black Granite Surface Plates are giving extraordinary satisfaction. If you are not acquainted with these superior surface plates, it will pay you to order one or more soon and learn their advantages by actual use.

MAIL COUPON or
write for details.
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**State Manufacturing and Construction Co.
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Send complete information on VELSEY Black Granite
Surface Plates; also on ☐ DIALSET Boring Tools and
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A Suggested Plan for Increasing Pay By Reducing Prices

By C. W. HINMAN

IN reconverting our industrial system to prewar conditions of normalcy, all attempts to solve the problem by increasing wages and adding the cost to the consumer's prices will fail, because it will cause inflation, reduce cash purchasing power, defeat its own purpose, and finally result in disastrous depressions and industrial chaos.

A better policy to follow is to start business going on a certain **price reduction** basis rather than on a **price increasing** plan, as is now being attempted. This proposal is not such an impractical plan as may be supposed. It can be put into operation easily and immediately.

For example: Consider a typical case in which strikers are asking a 30 per cent increase in pay on the assumption that prices of commodities have advanced 30 per cent. (the 30 per cent figure is used for purposes of illustration only.) This and similar demands can be settled by reducing the prices that workers must pay at the stores. To do this, arrangements can be made so that they can purchase their supplies at 30 per cent reduction.

The plan is to issue tickets or stamps similar to war ration stamps to the buyers, the stamps being good for 30 per cent discount on all purchases. The merchant turns in his stamps to a government agency for redemption. However, the actual cost to the government is only $\frac{1}{3}$ of the 30 per cent, or only 10 per cent, according to the following arrangement.

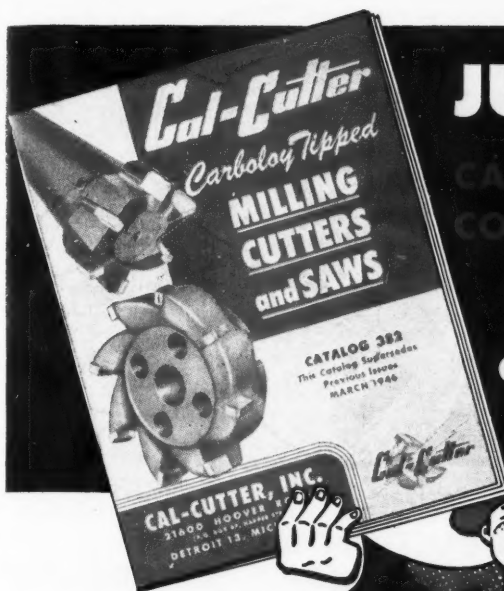
The 30 per cent is divided equally in three ways. One-third is added to the retail price of the goods manufactured; one-third is absorbed by the

manufacturer, who is reimbursed by the increased selling price of his goods, one-third is paid by the government.

The government can be reimbursed by removing or lessening some of the bonuses now being paid, or by assessing it against the defeated Axis Powers as reparations. Thus a profitable opportunity would be given our government to furnish raw materials to Germany, Japan, and Italy in order to assist them to start business again, and enable them to pay light reparations.

From the simple list of facts presented above, we can easily deduce the following desirable conditions.

1. The purchasing power of wages will be increased and the cost of living reduced about 30 per cent.
2. The cost of manufacture would not be increased one penny; in fact it would be reduced so that the business could be conducted with less capital.
3. The 10 per cent increase in the prices of a few articles of merchandise would be a negligible amount to the purchaser.
4. Inflation would be avoided and the O.P.A. and all black markets eliminated.
5. The never ending increase in wages and prices to the consumer would be stopped, and our old time system of work, wages, production, and opportunity for everybody saved for posterity.
6. The value of outstanding government war bonds would be stabilized.
7. This plan would enable us to gradually return to normal business conditions with prices very close to those we paid before the war.



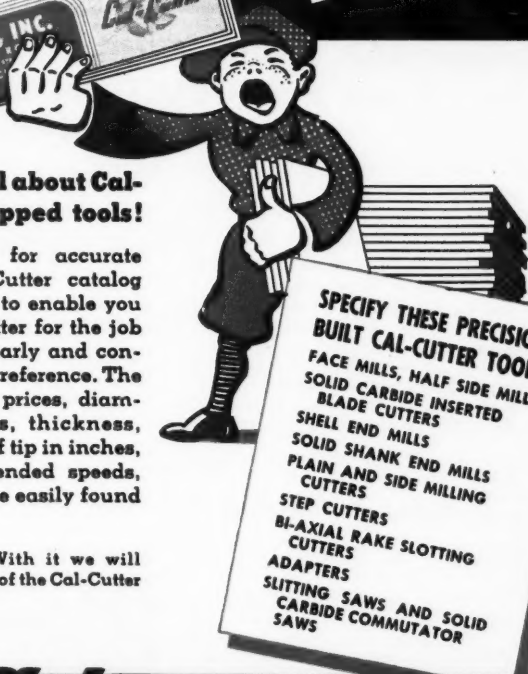
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It's New! It tells all about Cal-Cutter carbide-tipped tools!

• For easy ordering, for accurate data, this new Cal-Cutter catalog covers all information to enable you to select the correct cutter for the job to be done. Data is clearly and concisely outlined for easy reference. The tool, catalog number, prices, diameters, number of tips, thickness, diameter of bore, size of tip in inches, tip chamfer, recommended speeds, feeds and other data are easily found in this new catalog.

Get Your Copy Now! With it we will send the name and address of the Cal-Cutter distributor nearest you.

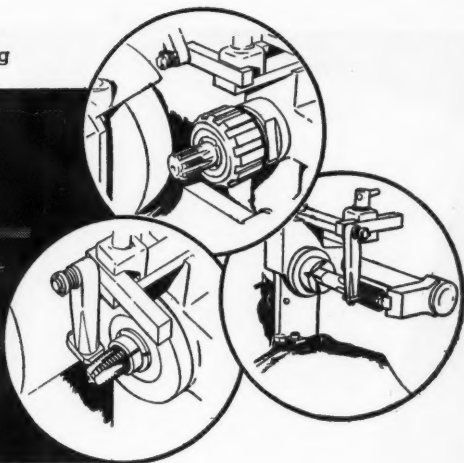
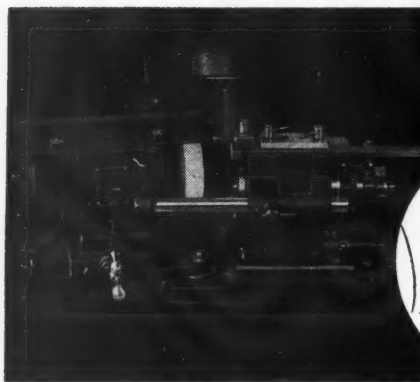


**SPECIFY THESE PRECISION
BUILT CAL-CUTTER TOOLS**
FACE MILLS, HALF SIDE MILLS
SOLID CARBIDE INSERTED
BLADE CUTTERS
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SAWS

Cal-Cutter COMPANY

31400 Hoover Road (P. O. Box 97, Harper Station) Detroit 13, Michigan

Model No. 1 for taps up to 6" long
Model No. 2 for taps up to 14" long



Put Your TAP SHARPENING on a PRODUCTION BASIS with the BLAKE TAP GRINDER

The Blake Tap Grinder—like your production machines which you have chosen carefully and wisely—will give you the maximum returns on your investment of man-hours and money.

Every operation necessary for the accurate chamfer sharpening of taps has been reduced to take the least possible amount of time. Some of these "production sharpening" features of the Blake are:

- Taps may be inserted or removed in a few seconds.
- It's easy to change from size to size.
- You can sharpen right-hand or left-hand taps without any change in the machine.
- You can sharpen a wide variety of taps, with 2, 3, 4, 5, 6, 8 or 10 flutes. (Also sharpen

countersinks, the lead on reamers, 3- and 4-flute drills, step drills, and many other tools requiring relief on the point.)

- It has a special adjustable eccentric mechanism which allows both the chamfer angle and the relief—of all the lands—to be ground in one continuous operation.

You can't afford to risk having your production machines idle because of a lack of sharp, accurately ground taps. Mail the coupon for complete details.

No machine is better than the cutting edge of the tool it uses.

Please send me Bulletin 544 which gives complete details on Blake Tap Grinders. MMS

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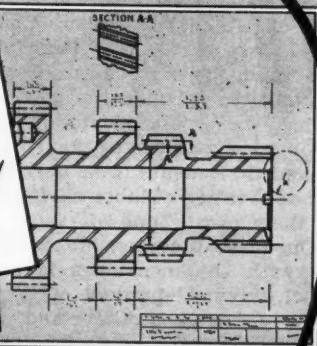
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BLAKE TAP GRINDERS—FILTAIRE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK DIAMOND
PRECISION DRILL GRINDERS—WALTHAM CUTTER SHARPENERS—HAGER CARBIDE TOOL GRINDERS

Jack— This seems like the real way to pin down responsibility on our gear tools. Believe Michigan Tool is the only outfit that produces all types of spurs and helicals - from blank to finished gear. Have we got one of their catalogs? If not, let's get one right away - Bill

P.S. Undoubtedly they can give us some good engineering service, too

No Divided Responsibility Here



ROUGHING TOOLS	PRE-SHAVE TOOLS	FINISHING TOOLS	SUPPLIER
HOBBS	HOBBS	HOBBS	MICHIGAN TOOL
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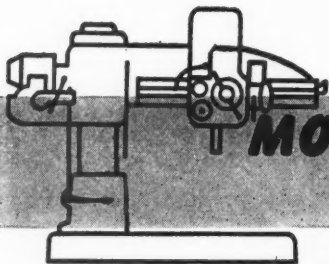
Write for complete catalog on your company letterhead

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MODERN EQUIPMENT AT WORK

Power Chuck Wrench Aids Production

THE Standard Stoker Company, Incorporated, Erie, Pennsylvania, has taken the hard work out of firing locomotives through the development of a power-operated stoker, but the company's executives haven't overlooked the benefits to be derived from the application of labor-saving devices in their own shops.

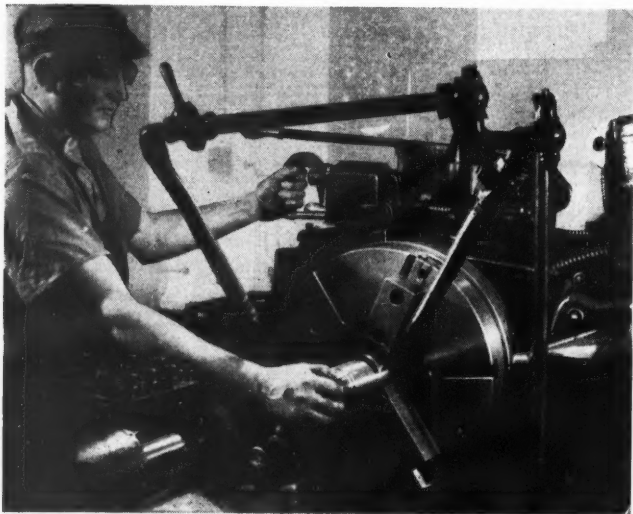
One piece of equipment that is popular with the mechanics is a power chuck wrench—product of Warner & Swasey Company, Cleveland, Ohio,—which takes the brute work out of

chucking heavy pieces in the lathe. Applied to a three-jaw chuck, the chuck is made to grip heavy work tighter than it can be gripped by the use of a hand wrench and, the power can be applied as easily as the turning of a doorknob. The operator engages the wrench with the chuck in one movement of a handle, and applies the power by turning the same handle.

The gripping pressure applied by the chuck-jaws can be regulated through a transformer that is pre-set, so that the pressure applied through all jaws is uniform and will be exactly the same for each piece held in the chuck. The ability to thus regulate the pressure

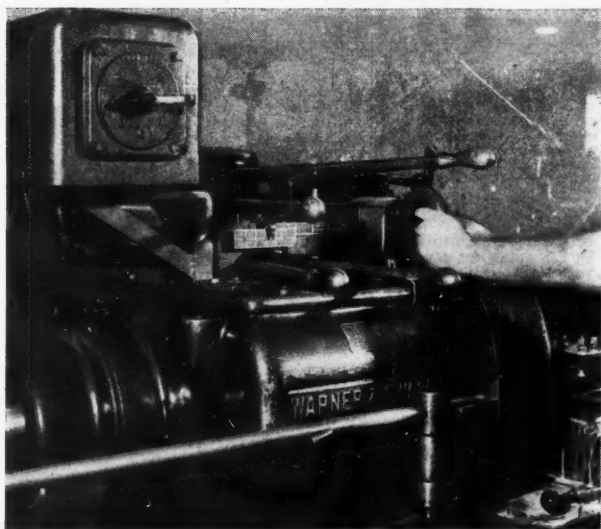
also makes it possible to hold delicate work without distortion.

The electrical equipment is housed in a control box, and includes a reversing starter and a tapped auto-trans-



The Power-Operated Chuck Wrench shown Here Relieves the Operator of Physical Strain and thus Speeds the Loading and Unloading of the Work

The Operator Engages the Power-Operated Wrench by Pulling the Handle, and Applies Power by simply Turning the Same Handle to the Right or Left for Chucking or Releasing the Work



former which provides eight adjustable voltages for the motor and consequently eight values of torque for chucking. The transformer taps are selected through a rotary selector switch on the dial face of the control box. The handle by which the wrench is engaged in the chuck is conveniently reached from the operator's working position, and may easily be turned to right or left to operate the motor for tightening or loosening the jaws of the chuck.

A safety interlock with the clutch lever precludes the possibility of starting the spindle while the wrench is engaged. The lug-type chuck pinion and wrench afford great strength under pressure and facilitate easy engagement. The chuck band provides added safety for the operator. The power

chuck wrench can be used on bar work as well as on chucking work.

Largest Sintered Carbide-Tipped Tools

PROBABLY the largest sintered carbide tipped tools ever used on boring mills were those used for boring cast armor on Army tank parts, it has been revealed.

Pictured above is one of the Firthite-tipped tools taking a 2 3/4-inch



HINGES

**VARIOUS WIDTHS
and GAUGES**



**BUTTS AND
CONTINUOUS LENGTHS**

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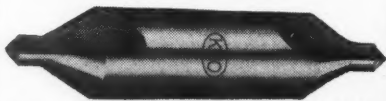
S & S MACHINE WORKS

4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

**For
GUARDS
CABINETS
CASES
BOXES**

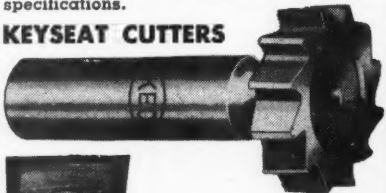
KEO

CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand. $\frac{1}{2}$ " shank. Diameters from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS



High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82° or 90° included angle. Specials made to your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{3}{16}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19426 Woodward - Detroit 3 Mich.

wide cut at a 9-deg. angle on the inner face of a guard ring for a tank. Despite the unusually heavy cut and the fact that the cut was "interrupted," a speed of $7\frac{1}{2}$ r.p.m.—several times the speed possible with the tools previously used—was attained. The feed was 0.011 inch per revolution. These special tools were fabricated from the fabricating company's blueprints by Firth-Sterling



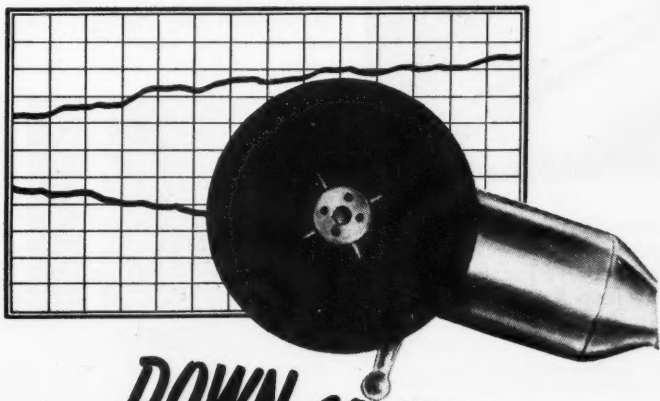
Firthite-Tipped Tool Taking a Cut $2\frac{3}{4}$ -Inch Wide on a Guard Ring for an Army Tank

Steel Company. The Firthite tip is the darker portion of the tool shown in use above.

Army ordnance officers originally planned for 650 of these boring mills to meet tank production requirements, but the capacity of the mills, when equipped with sintered carbide tools, so exceeded expectations on turning, facing and boring operations that only a few more than 400 mills were required. Designed by the Consolidated Machine Tool Corporation, the special boring mills were built

WELDISK

UP 60 GRINDING SPEEDS



DOWN 60 GRINDING COSTS

Prove it to yourself with FREE SAMPLES

If the test of the pudding is in the eating, the test of an abrasive is in the grinding. It will pay you to test WELDISKS yourself - to prove to your own satisfaction that WELDISKS are superior abrasives for use on high-speed pneumatic grinders as well as on any portable electric grinder. You will be amazed to find that WELDISKS outlast ordinary disks by as much as 2-to-1 ... partly because of

their cold-setting cement (a scientific formula - not glue or resin) that actually improves with age, and partly because of their laminated backing of fibre for stiffness plus cloth for strength. A test of WELDISKS will convince you of their superiority. Write for free samples. State size of disk, grade of grit, and brief description of work to be done. WELDISKS will be sent promptly without obligation.

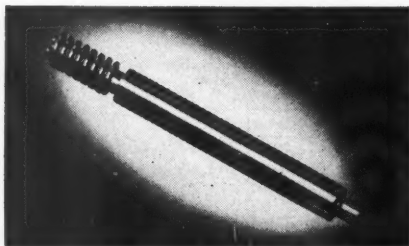


Abrasive Products, Inc.

SOUTH BRAINTREE 85 MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES

PRECISION PARTS

PRECISION IN THE NEWS



Here is an essential part of modern telephoto equipment—a motor shaft precision-made by Ace. One of the interesting features of this piece was the tiny drill rod insert $\frac{1}{4}$ " long and $\frac{1}{16}$ " in diameter. It was formed, heat-treated, and centerless ground, and then press-fed into a $\frac{1}{16}$ " reamed hole at the end of the shaft.

RELY ON ACE FOR PRECISION GRINDING Centerless, Internal Cylindrical, External Cylindrical, Blanchard Surface, Plain Surface, and Thread Grinding.

PRODUCTION MACHINING Turning, milling, drilling, cutting, tapping, and threading of small machine parts that require precision grinding—on a mass-production basis.

METAL STAMPING Blanking, forming, and extruding of small metal parts on presses up to 75-ton capacity. Spot welding, sub-assembly and assembly of intricate radio and machine parts.

HEAT TREATING Electric and gas furnaces, individually pyrometer controlled, for high-heat, quenching, and carburizing of parts up to approximately 10"x10"x15".

TOOL AND DIE WORK All operations for the production of Punches and Dies for small stampings, for Jigs, Fixtures, Gages, Moulds, Form Blocks, Tool Bits and Circular Form Cutters.



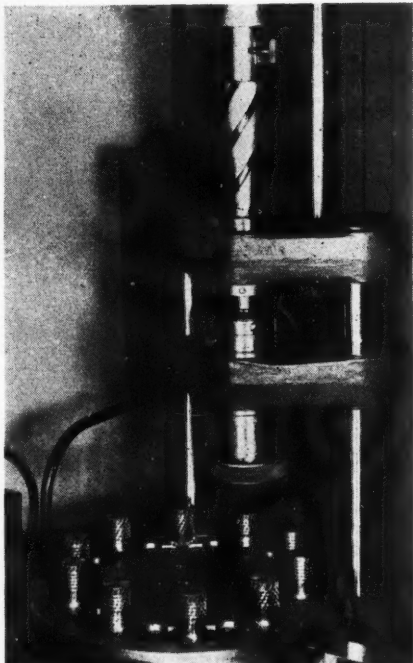
ACE MANUFACTURING CORPORATION
for Precision Parts

1235 E. ERIE AVE., PHILADELPHIA 24, PA.

by six different manufacturers. Three sizes were built; 78 inch, 100 inch, and 112 inch.

Broaching Blind Holes

AN ingenious and effective use of broaching where at first glance its applicability seems out of the question is illustrated in an installation recently completed by Colonial Broach Com-

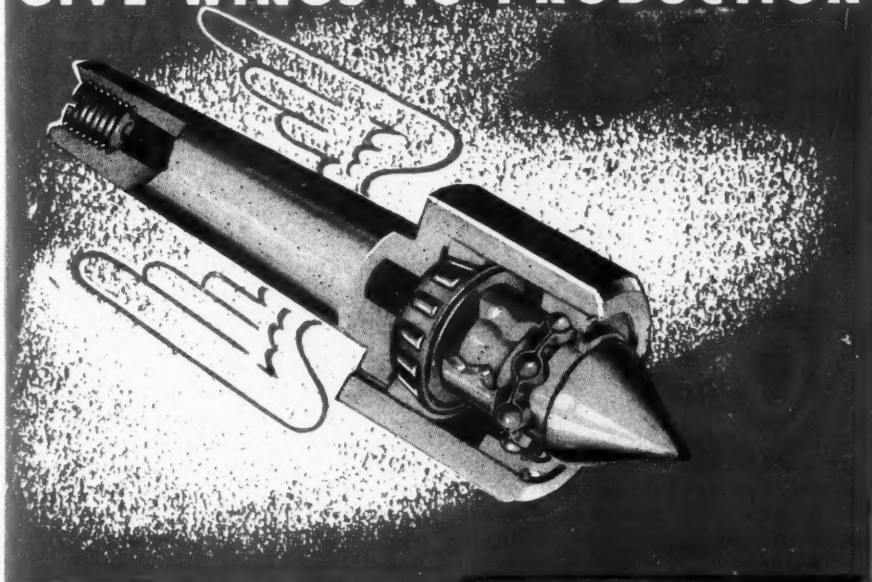


Using 10 Short Broaches, Helical Splines are Broached in a Part that is Held in a Head on the End of the Ram

pany, Detroit. The job is the production of helical splines in a blind hole in a transmission part, the design being such that the tool cannot pass through the work.

Theoretically, broaching could not be used. However, the use of broaching

GIVE WINGS TO PRODUCTION



IDEAL "Multi-Duty" LIVE CENTERS

Speed up machine output by making it possible to turn heavier loads, take deeper cuts, at higher speeds.

A real precision tool that assures accurate turning. Has precision bearings—both, ball bearings for radial load, tapered roller bearings for thrust load.

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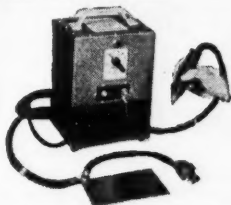
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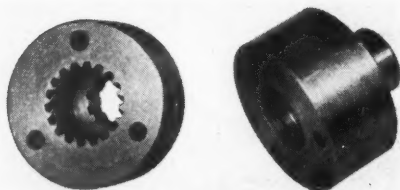
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Sales offices in Principal Cities — Consult your local telephone book — In Canada: Irving Smith Ltd., Montreal, Quebec

July, 1946

MODERN MACHINE SHOP 193

with its advantages of combined precision and high output, was made possible by simply undercutting a recess beyond the section of the part to be splined (for broach clearance at the end of the cut). Ten short broaches—



Transmission Component in which Helical Splines are Broached in a Blind Hole

each with five sets of cutting teeth—are used in place of a single long broach. Further, instead of actuating the broaches, the broaches are mounted on an indexing table (hydraulically actuated) and the part is held in the

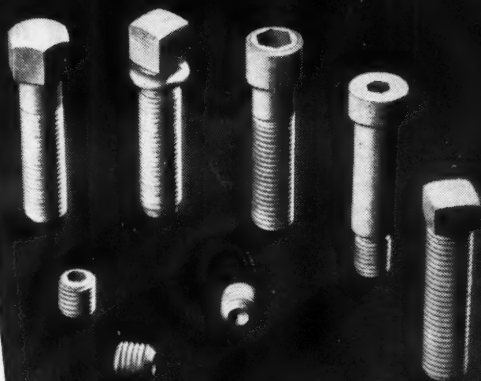
moving ram head, the latter being equipped with a master lead bar actuated by the movement of the ram.

Machine cycle is completely automatic. The operator merely loads the part and pushes a button. The ram moves down, pushing the part over the first broach, then the ram returns and stops. The table automatically indexes to the next station. The cycle then repeats automatically until the part is finished, at which time the machine stops for re-loading.

The part, of course, is stripped off the broach on each return stroke. Obviously, also, broaches must be exactly spaced and located so that the teeth of the different broaches will track each other as they progressively cut the spline to finished size and shape. With this arrangement the cutting effect obtained by the use of the 10 short broaches is the same as if a single long broach was used.

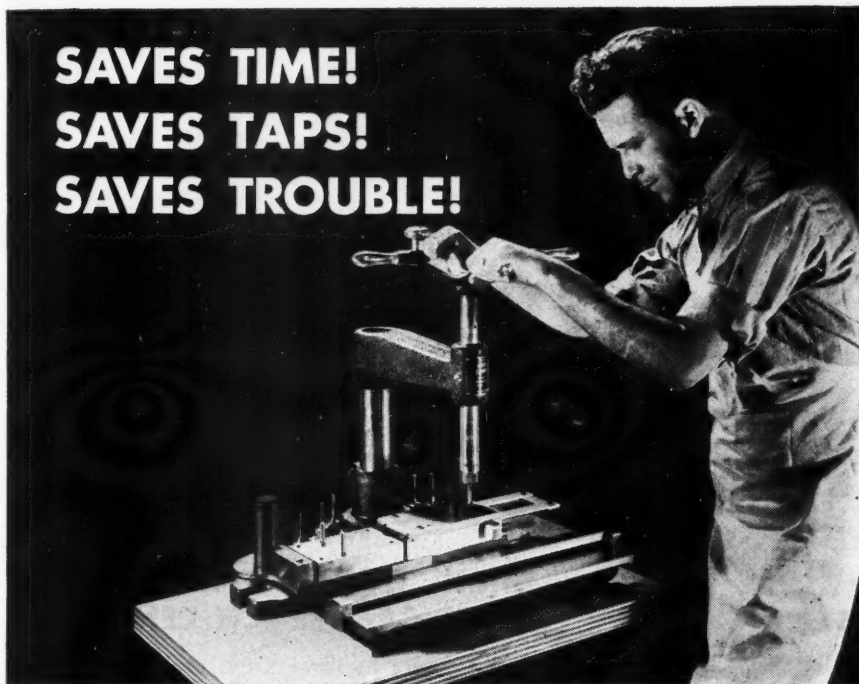
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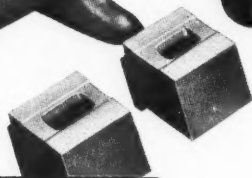
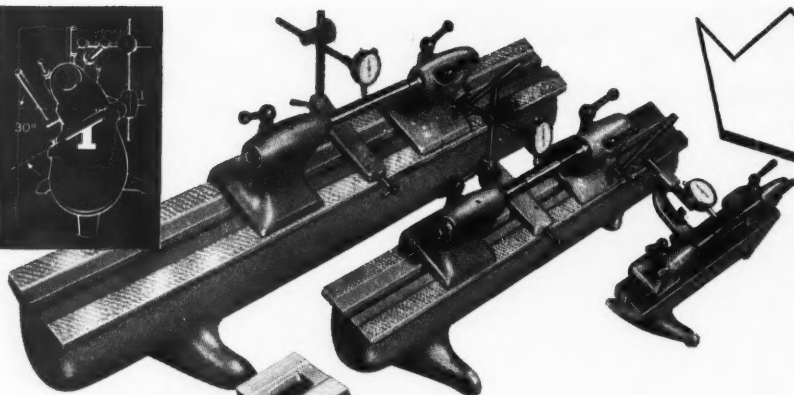
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New Catalog 46 gives details. Copy on request.

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Bench Centers may be used to check gears and other special production parts, impossible to check in any other way, by means of fixtures we design and build.

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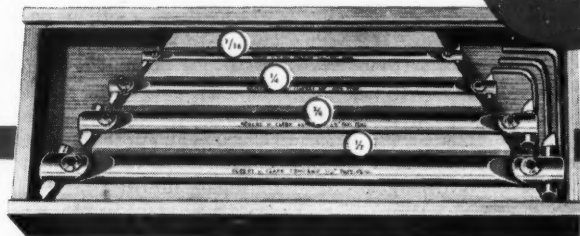


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WITH PRECISION GROUND REPLACEABLE BITS

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Remember, only Clark Lever-Lock Boring Bars give you small sizes down to 3/16" O.D. They have no interfering set screws or bolts, and can bore or thread to bottom of blind hole with full clearance. 15° holding channel in one end, right angle channel in other.

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Dimensions of Boring Bars		Size of Cutters Round	Can be used with Clark Tool Holders Nos.	
Diam.	Lgh.			
3/16	5	3/32	P60R, P61R	
1/4	6	1/8	P60R, P61R, P62R	
3/8	7	3/16	P61R, P62R, P64R	
1/2	8	1/4	P62R, P64R	

Extra bit, ground or unground, carbide or hi-speed steel available from stock



Clark Lever-Lock Bars are held rigidly in standard Clark Parallel Channel Tool Holders without use of adapters



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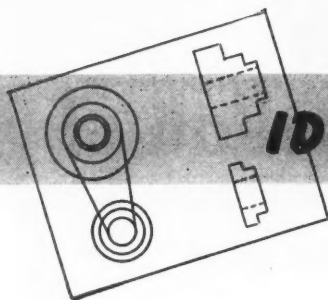
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IDEAS FROM READERS

Design for Tank Hood

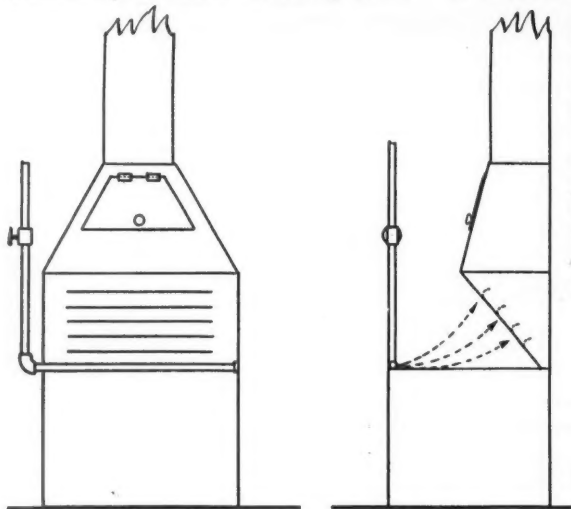
By R. A. SHAW

VENTILATION must be provided for tanks in which sulphuric, muriatic or nitric acids are used if health problems resulting from the presence of acid fumes are to be avoided. Processes involving the use of phosphoric acids, sodium nitrates, caustic baths and alkaline liquids are also hazardous, and safety precautions should be considered at the time of installation of the equipment in which they are used. Working condi-

tions can in many cases be improved by the use of ventilators and hoods of the proper design.

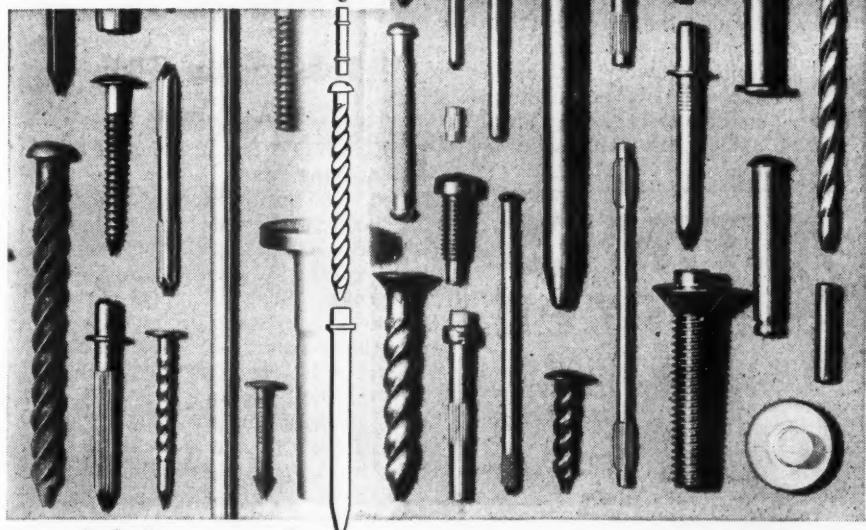
The drawing illustrates the design of a hood that was developed for use in a Detroit manufacturing plant. The tank is of common design, and a floor platform of slip-resistant material, provided with drainage vents, is positioned in front of the tank for the operator to stand on. Attached to the rear of the tank is the hood, from which extends an exhaust pipe that carries the fumes to the outer air.


The hood is made of sheet copper or sheet metal that has been treated to make it acid-resistant. It is perpendicular at the rear side, but the front of the hood projects over the tank at an angle that is calculated to catch the fumes and keep them from escaping into the surrounding atmosphere. To provide access for cleaning the inside of the hood, a door is located at



Drawing Illustrating Design of Hood for Acid Tank

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Special nails, rivets, screws and threaded parts

the front, within easy reach of the operator. Louvres are cut in the front of the hood about six inches apart and $\frac{1}{8}$ to $\frac{3}{16}$ inches wide.

Extending across the front wall of the tank is a pipe that is connected to the shop air line, as shown. Holes $\frac{1}{16}$ to $\frac{1}{8}$ inch in diameter and spaced about six inches apart are drilled in the pipe on the side facing toward the hood. When the tank is in use,

air is blown out through the holes in the pipe with sufficient velocity to carry the fumes back toward the vents in the hood, through which they enter the exhaust pipe.

Telescoping Gage

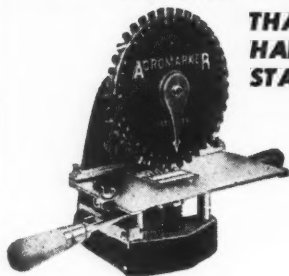
By A. W. PAYNE

HEREWITH is a drawing of a telescoping gage which we have found to be quite practical in measuring large diameters, and which has the added advantage that it eliminates the expense of a large micrometer or vernier. Using this gage, parts can be checked to close limits by a comparatively inexperienced operator.

Part A is a section of $\frac{1}{4}$ -inch pipe 25 $\frac{1}{4}$ inches long, and B is of $\frac{3}{4}$ -inch pipe 10 $\frac{3}{16}$ inches long. Part B slides in part A and is locked in position by the use of two thumbscrews C, threaded through the pieces D which are anchored in place by welding. Parts D are $\frac{5}{8}$ inch diameter by $\frac{3}{8}$ inch high and are tapped 5/16-18 for the thumbscrews. Two rests E and F are provided to support the gage on the work, rest E being welded to part A and rest F to part B. Both rests are of steel and are machined to fit the contour of the pipe. Rest E is $\frac{1}{4} \times \frac{1}{2} \times 1$ inch before being machined to fit the curve of the pipe, and part F is $\frac{1}{4} \times \frac{3}{4} \times \frac{7}{8}$ inch.

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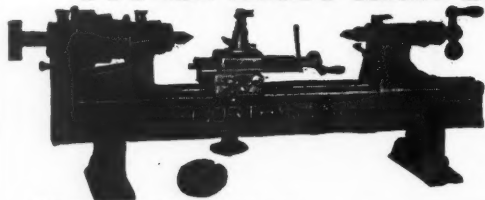
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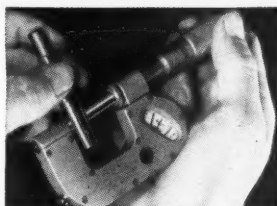
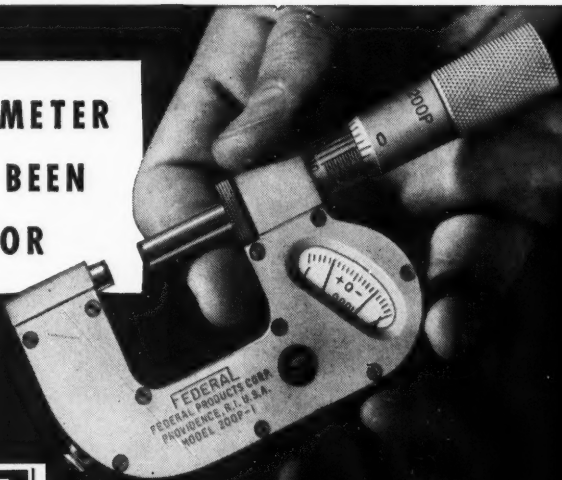
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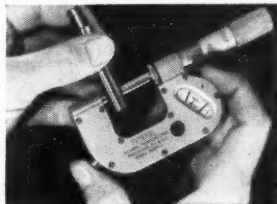
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This new Federal Indicating Micrometer combines the precision of the Dial Indicator for uniformity of contact pressure and for use as a comparator, with the accuracy of the micrometer thread for measuring.

You do not need the skill of a toolmaker to operate it accurately. The Dial Indicator insures uniform contact pressure.

It takes the place of a complete set of "go and no-go" gages, because you can set it to the required size, clamp it in that position, and gage your batch of workpieces.

Anvil is retractable. Both contacts are Tungsten Carbide tipped.

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VERTICAL SPINDLE —
Cylinder Wheel or Segments
RECIPROCATING TABLE

2

VERTICAL SPINDLE —
Cylinder Wheel or Segments
ROTATING TABLE

3

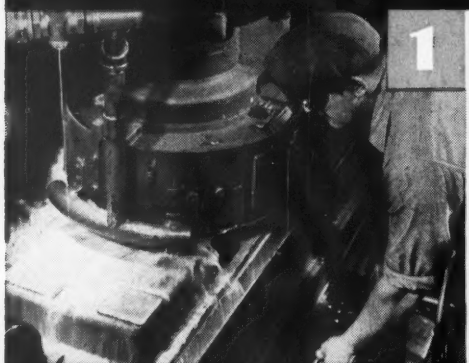
HORIZONTAL SPINDLE —
Straight Wheel
RECIPROCATING TABLE

4

HORIZONTAL SPINDLE —
Straight Wheel
ROTATING TABLE

5

HORIZONTAL SPINDLE —
Cylinder Wheel or Segments
RECIPROCATING TABLE



2



3



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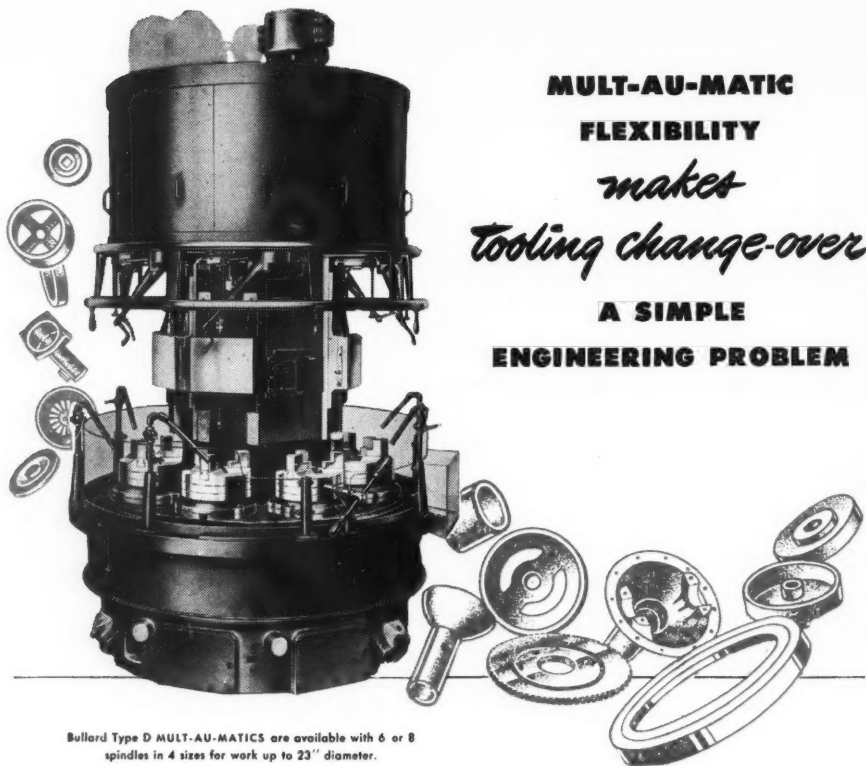
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A SIMPLE ENGINEERING PROBLEM

Bullard Type D MULT-AU-MATICS are available with 6 or 8 spindles in 4 sizes for work up to 23" diameter.

If a Bullard Mult-Au-Matic means to you a special-purpose, quantity-production machine for turning out thousands of parts in continuous process, you are only half right. You have overlooked its proved versatility . . . its ease of change-over.

Change-over from one type of work to another is comparatively simple with Bullard Mult-Au-Matics for three reasons:

1. Universal, Convertible Double-

Purpose and Auxiliary Heads are quickly set up for new boring, turning, facing, threading, grooving and drilling operations on all classes of castings, forgings and cut-off bar stock.

2. Each tool head permits selection of 82 standard rates of feeds completely independent of any other head . . . with other rates possible by simple gear changes.

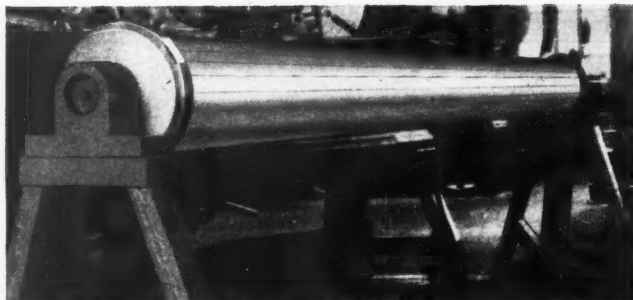
3. Each spindle may be set for any

one of 41 independent speeds.

Such in-built flexibility suggests that Bullard Mult-Au-Matics may fit diversified work schedules for which you may never have considered them. It costs you nothing to talk things over with a Bullard sales engineer. In the meanwhile, write for Bulletin 7-6-45 which gives complete specifications of Bullard Type D Mult-Au-Matics. The Bullard Company, Bridgeport 2, Connecticut.

BULLARD

BULLARD CREATES **NEW METHODS** TO MAKE MACHINES DO MORE



Reference Gage for Laying Out Locomotive Rods to Length

Reference Gage for Locomotive Rod Lengths

By BARTLETT WEST

SHOWN in the photograph is a reference gage that is used in a western railroad shop to simplify the task of laying out locomotive shoes and wedges, tramming wheels, and checking side rods lengths.

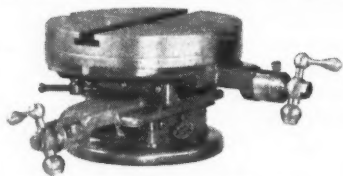
The gage consists primarily of a section of 12-inch pipe (actually a piece of 12-inch well casing) that has been turned and polished in the lathe. A true line is scribed around the pipe near the left end to aid in locating the various prick punch marks that serve as starting points for laying out rod lengths, and a number of lines are scribed longitudinally on the cylinder, about two inches apart, to act as guide lines and to avoid confusion in setting trammel points to any of the specified

tape. Letters and figures indicating the class of engine for which each mark is to be used are stamped into the cylinder adjacent to the marks.

This gage is much more convenient than the previous equipment, which consisted of round and hexagonal bars upon which the dimensions were recorded, and which were stored in a wooden case at the bench. To reduce the amount of walking necessary, the gage is located half way between the erecting floor and the rod bench.

The gage trunnions are old locomotive reverse shaft bearings, mounted on wooden frames designed to locate the gage at the most convenient height for use, and the gage is easily rotated. Regarding rod lengths it is of interest to note that for old-style, narrow firebox engines with the firebox between the frames, the rods are adjusted 1/32 inch long on a cold engine.

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You can get any degree of hardness you want, in the surfaces of these unique gages which align themselves automatically on ball bearings — and so enter the work *straight*, on their own weight, regardless of the angle of approach.

Availability of Taft-Peirce-Emmerton Gages with super-hard wearing surfaces means *extra* life for these gages which, already, have recorded consistently far longer useful life



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than standard plugs — because of the distribution of shock and front-end wear over an infinite number of points on the rotating, hardened steel balls in the annular retainer. Single or double-end models, in all sizes from $\frac{1}{4}$ " up. Write:

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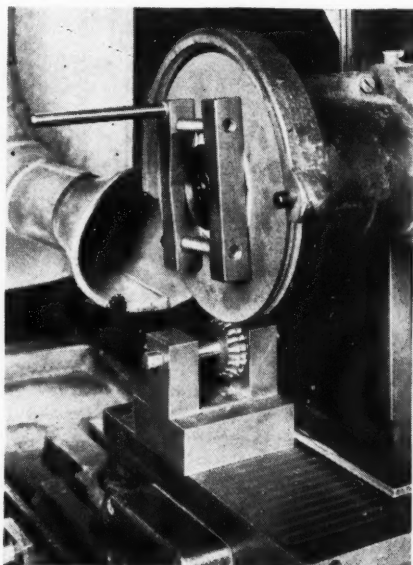
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Tools for Truing Form- Grinding Wheels

(Courtesy General Electric Company)

WHEELS for form-grinding are trued to shape accurately and with a minimum of need for skill at General Electric's West Lynn Works by using circular truing tools of the



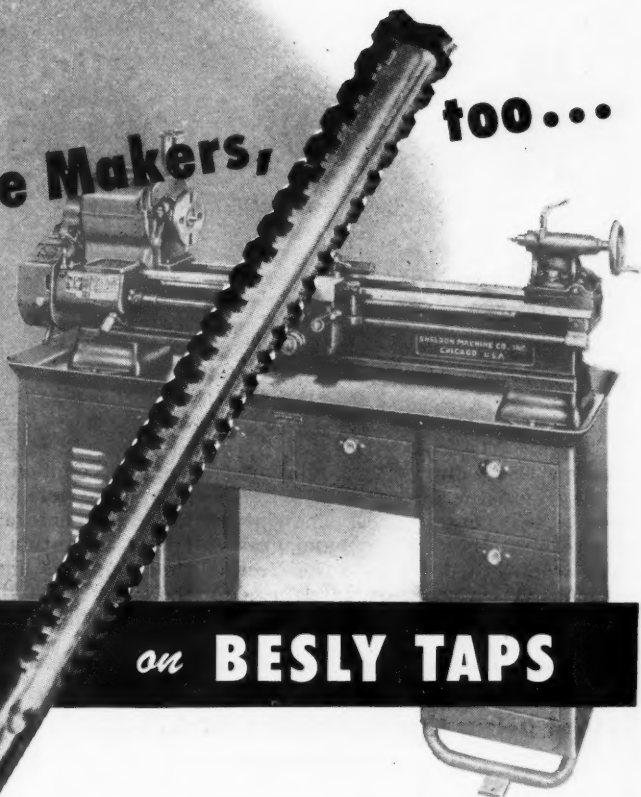
**Form-Grinding Wheel Set Up to be Trued to
Shape with Special Truing Tool at G. E. West
Lynn Works**

type shown in the illustration. These tools have speeded the forming operation considerably, particularly where complicated shapes are involved.

The tools are made from plain carbon steel, hardened glass hard. Radial saw cuts in the peripheries of the tools are made after they have been turned to size and shape. The saw cuts are spaced irregularly to minimize wear.

To form a wheel, the tool is mounted in a holder provided with adjustable hardened male centers so that it

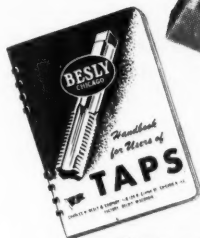
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In manufacturing bench and tool room lathes, the Sheldon Machine Co., Chicago, uses Besly Taps to maintain the close tolerances specified in all threading operations. Like other manufacturers of fine equipment, Sheldon recognizes that precision in a lathe can be no greater than the accuracy of the tools used to build it.

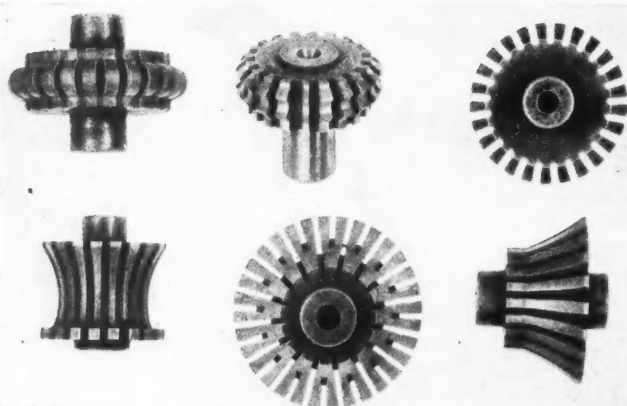
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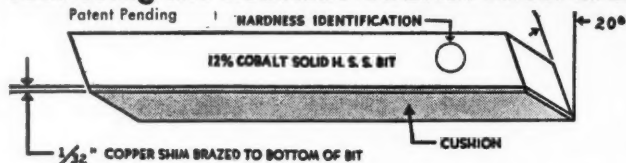
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revolves freely but with a minimum of play, and the device is then fixed upon a magnetic chuck. The operator revolves the wheel by hand, gradually feeding it down onto the circular tool. The wheel is rapidly formed to the desired shape, allowing the cut

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1/2	1/2	4	2.16	2.11	2.06
5/8	5/8	4 1/2	3.35	3.30	3.25
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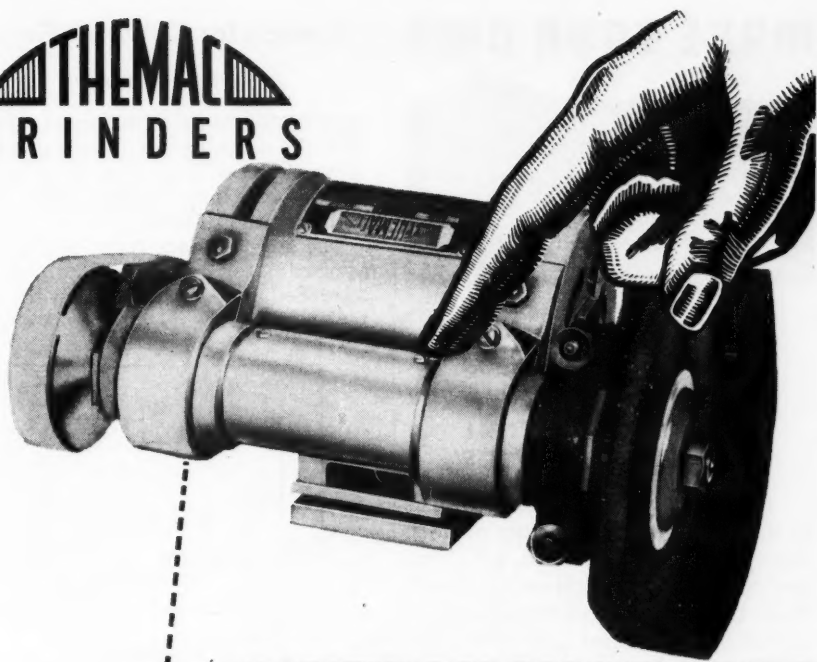
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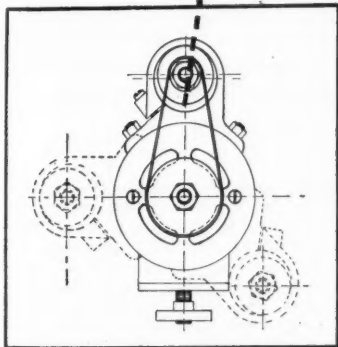
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The dotted line points to the manually operated eccentric tube. This exclusive THEMAC feature provides proper belt tension at all times.

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July, 1946

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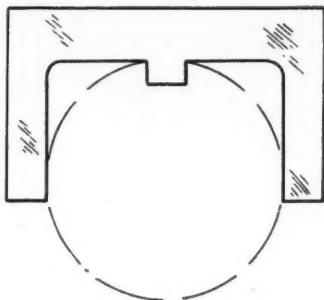


Design for Keyway Gage

By RONALD EYRICH

WHEN identical keyways are to be machined in a large quantity of workpieces, time can be saved by the use of a gage such as that illustrated in the drawing.

The gage is made from tool steel of approximately $\frac{1}{16}$ inch thickness, hardened and then ground on the contacting surfaces. Dimensions are de-



Design for Gage for Checking Three Keyway Dimensions Simultaneously

termined by the specifications for the keyway and the size of the material, but the square section that fits into the keyway must be in the exact center of the gage so that the keyway can be gaged for width, depth and central location in one movement.

"Magnetic Holding Methods" is the title of a 24-page booklet prepared by the Rockford Magnetic Products Co., 1302 18th Ave., Rockford, Ill., purpose of which is to provide information on material holding that will be of practical help to those seeking ways and means of increasing the output of men and machines in their plants. A section of the booklet features illustrated and descriptive data on Rockford "Power-Grip" Standard Chucks, Viking Chucks, Rotating Chucks, Hand Magnets, and Holst Magnets. Copy free upon request.

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Guest Editorial

By THE HON. ELLIS GIBBS ARNALL

Governor of Georgia

ANYONE can find economic security in the poor house. Three square meals, a good roof, ample clothes, a good bed, plenty of leisure time each day. The only basic thing you don't find there is opportunity . . . and individual opportunity is the greatest desire of every real man. Without it, all security is degrading.

Everyone knows that our economic hope is in increased production. It is the only way towards prosperity. And there is certainly great individual opportunity for increased production today. We must enthusiastically realize that there is no substitute for that four letter word—WORK.

The difference between success and plodding is willingness to work. Ability to get ahead and to earn the good things of life comes from ability to produce. Unfortunately, it seems to me, we are pushing down the standards of workmanship. We are showing too much enthusiasm for doing less work, ignoring the fact that the man on the job who doesn't turn in a honest day's work is cheating no one so much as himself.

You can't get increased production without increased work. It can't be accomplished by passing some new law. Success can't be legislated. Man must achieve his own destiny . . . law merely gives him the chance.

The solution is entirely one of the human equation. What is your attitude and mine towards work? There is a joy in work and a pride in workmanship that are among the greatest pleasures of our individual lives. Do we feel this joy and this pride in our work every day? That is the question.

There is no thrill in mediocrity. I like to watch a good pool player, but I certainly don't hang around for long looking at someone who constantly dubs his shots. We can all be artists at whatever we do. That means that whatever our work, we should strive to do it well. The trouble is that too many of us are getting away from the dignity of work.

I believe in ambition and restlessness. I believe that we must make ourselves dissatisfied with the lower amount of poorer work we are doing. I believe that anything less than the best in a man is far too little to aim for, if one wants to make the most of his individual opportunity.

The fact is that if you can't do the job well, you don't like it. The tendency then is to loaf. And it is harder labor to loaf than to work . . . simply because there is no joy and no pride to be found in stalling, idling, loafing. The happiest man is he who knows he is good at his trade and constantly attempts to make himself better. There is no greater contentment than that which comes from a man's knowledge, in the depths of his own mind, that he is outstanding as a skilled and able worker. That man shall never know poverty.

I believe completely in organized labor. Since the early days of "Knights of Labor," such organization has aimed to protect the people. Of course, it can't protect them against the necessity of WORK.

Organized labor should push the standards of workmanship up, not down. To be endowed by collective bargaining with a job, a rating, a seniority, doesn't make a worker successful . . . it merely gives him a greater opportunity. And, by the very nature of its collectivism, if that worker stalls, he cheats his fellowmen.

Whenever any local union is endowed with more power, it is likewise endowed with more responsibility to encourage its members to turn in workmanlike jobs. Its

job is to get all union members to participate in the dignity, the joy, the pride of doing a better job, for increased production is the only sure and sound way to increase real wages and living standards.

The difficulty of late, it seems to me, is that management becomes so involved it overdrives, while labor, with increased power, tends to underdrive. And both take too little time for human relations. My criticism of big business is that it does not save sufficient time for human affairs. None of us can afford to lose the common touch.

Naturally, workers must get their fair share of created wealth, else all this increased production would be a white elephant, excess baggage, a lemon indeed. The processes and progress of present economic affairs assures the worker more definitely that his share is becoming fairer. Yet these gains in greater assurance of his fair share can be negated if the individual worker, idling behind such assurance, develops the habit of doing a less workmanlike job.

In recent years a tendency has developed in certain instances to slow down on the job, on the theory that prolonging the task provides jobs for additional workers. This theory is fallacious, because less productivity is reflected in higher costs, which in turn are reflected in higher selling prices and a restricted market. In the long run this policy results in fewer jobs.

There is indeed no substitute for WORK. And having the right attitude constantly to improve one's artistry of workmanship brings joy, pride and contentment as well as the many more material happinesses of life.

Any other attitude is over the hill and down the road to the economic security of the poorhouse.

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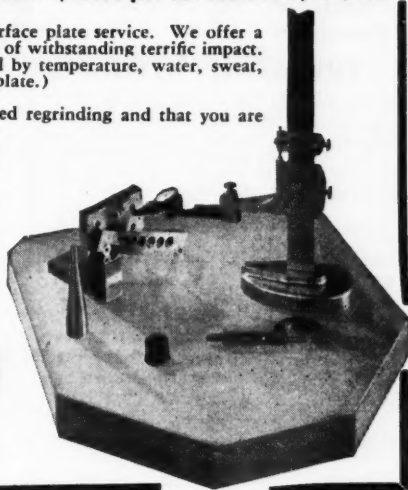
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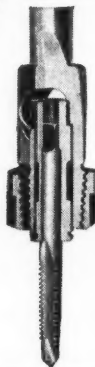
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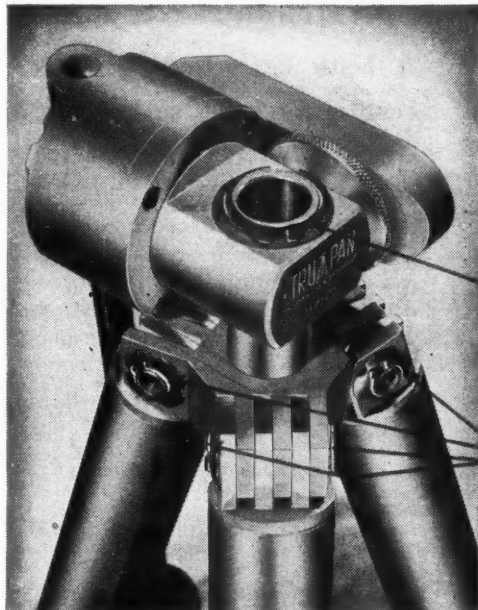
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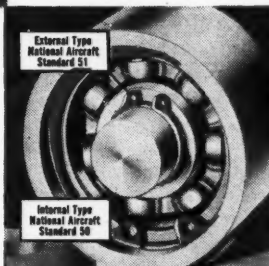
Use of 9 TRUARC retaining rings in manufacture of the TRUPAN Tripod has resulted in a light, compact design—with reduced production costs. Truarc rings eliminate expensive machining required for nuts, threads, screws and shoulders.

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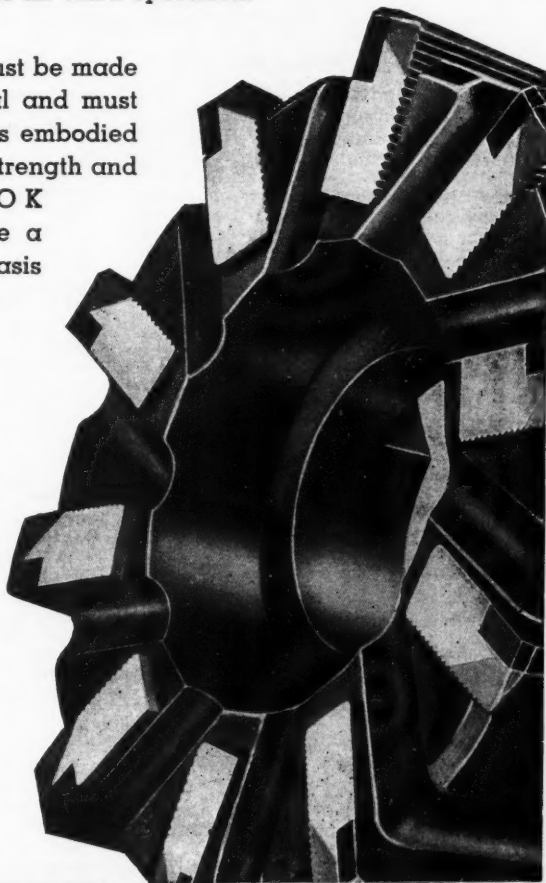
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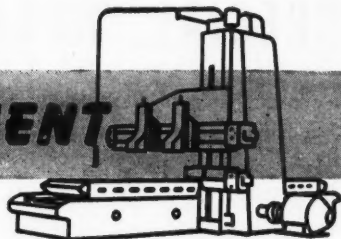


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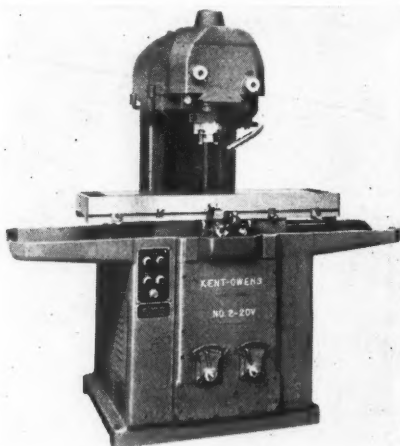
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NEW SHOP EQUIPMENT



Kent-Owens Model No. 2-20 Vertical Miller

A recent addition to the line of milling machines manufactured by the Kent-Owens Machine Co., Toledo, Ohio, is the Model No. 2-20 Vertical Miller illustrated herewith. Its construction is characterized by rugged simplicity, with the bed, column, and head all sturdy case members. A heavy table is guided by dove-



Kent-Owens Model No. 2-20 Vertical Miller

tail slideways directly cast to the bed, thus affording maximum support to the table.

The table is 42 inches long x 12 inches wide with a 20-inch travel and fully automatic cycle. It can be fed or rapid traversed in either direction, automatically shifted from rapid traverse in either direction, and automatically reversed at both ends of the stroke. It may also be automatically stopped at any

desired point in its travel.

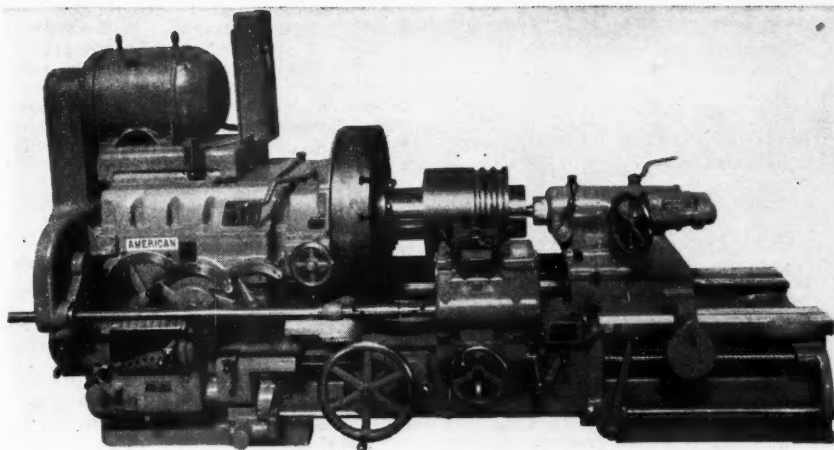
A unique feature of the machine allows for independent adjustment of the feed rate for opposite directions of table travel, thus permitting the milling of a part at one end of the table at a slow feed rate and also the setting up of an entirely different job at the other end requiring a faster feed rate.

The Miller has a 4-inch micrometer adjustment on the quill. The standard machine has a maximum gap of 10 inches between the nose of the spindle and the table surface. Two other column heights are also available, permitting maximum gaps of 12 or 14 inches. This close-coupled construction makes possible the selection of a machine with a gap best suited for a particular job.

The drive on the machine is simple and direct. Between the standard foot-mounted ball-bearing spindle drive motor and the cutter are only three gear contacts. The entire drive is mounted on anti-freeze bearings and has automatic lubrication.

A wide range of spindle speeds may be obtained by changing spline mounted pick-off gears contained in the head under a light aluminum cover. These gears have wide faces and operate in an oil bath. A medium speed range of 64 to 860 r.p.m. is standard for the machine, however, either a low range of 32 to 428 r.p.m. or a high range of 86 to 1,284 r.p.m. can be provided.

Specifications of the Kent-Owens Model No. 2-20 Machine are as follows: table size, 42 x 12 inches; table travel, 20 inches; width of (3) T-slots, $\frac{11}{16}$ inch; distance between T-slots, $2\frac{1}{8}$ inches; feed range (both directions), independently and infinitely adjustable from 1 to 40 inches per minute; rapid traverse in both directions, 315 inches per minute; spindle nose and taper, No. 40 National Standard; spindle motor, foot-mounted 3 h.p. 18,000 r.p.m.; hydraulic pump motor, foot mounted 1 h.p. 1,200 r.p.m.; net weight, 3,500 pounds.



"American" Roll Grooving Lathe

"American" Roll Grooving Lathe

The purpose of the "American" Roll Grooving Lathe built by The American Tool Works Co., Cincinnati, Ohio, is to

turn and form the irregular grooves in forging rolls. To accomplish this, a 42-inch "American" Super-Productive Lathe is equipped with a specially designed tool rest carrying cam-actuated

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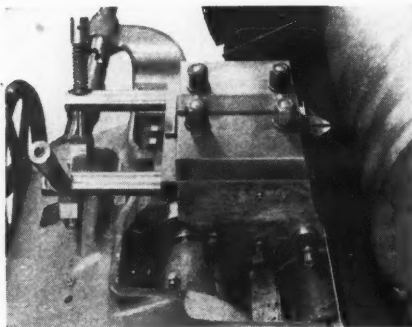
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Close-up view of "American" Roll Grooving Lathe showing tools and cams

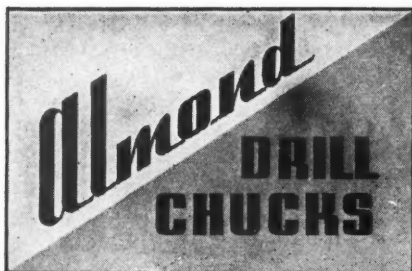
tools for simultaneously varying the width and depth of the grooves. To facilitate the action of the tools, an auxiliary spring positioning mechanism is provided. The drive for the tool rest is taken off of the rear end of the spindle and the power transmitted through a large multiple splined shaft to the knuckle joint which actuates the tool rest mechanism.

The automobile axle shaft forging rolls handled on the American Roll Grooving Lathe each have seven different grooves which must be machined from the solid. The completion of this operation requires 26 cutting tools and 50 different cams. The rolls are machined in half sections. For the grooving operation, one section at a time is bolted directly to the turning mandrel and the grooves formed.

Sibley 20-Inch Drilling Machine

A 20-inch drilling machine especially designed for drilling holes up to $1\frac{1}{4}$ inches in diameter in cast iron or the equivalent in other metals has been announced by the Sibley Machine and Foundry Corp., South Bend 23, Ind. Also available with a rotary geared coolant pump and tapping attachment, the unit is standard with a motor drive and belt guard or, where it is necessary to operate the machine from a line shaft, with tight and loose pulley drive.

The machined part of the main column is $5\frac{1}{4}$ inches in diameter. The drill table rotates on an arm which swings on the column to provide maximum working space. Both power and hand feed are

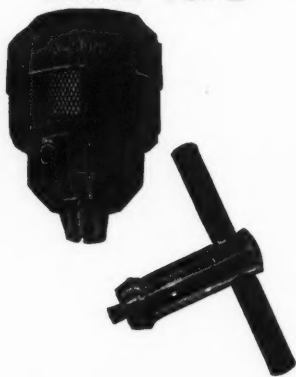


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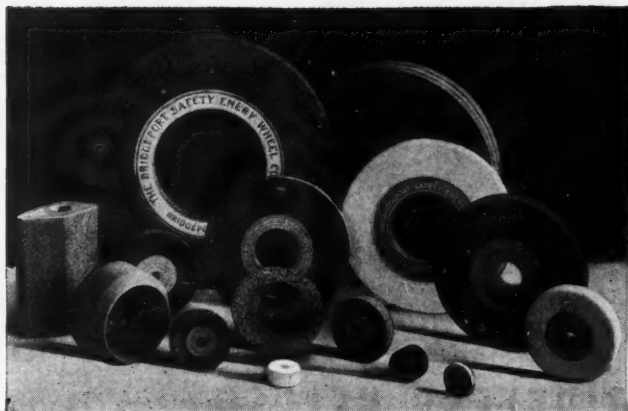
ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from $3/16"$ to $1"$. These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

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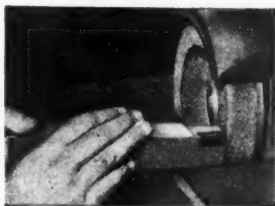
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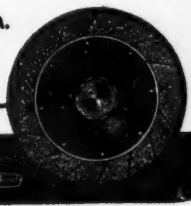
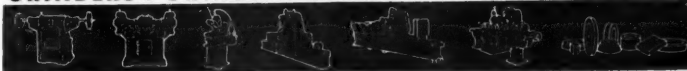
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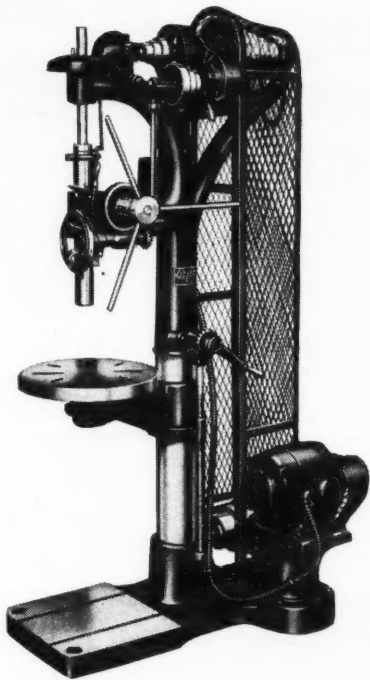
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**BLACKER
HAMMER**

furnished. Adjustment is provided for wear between the worm and worm gear to assure long and efficient service. On the motor drive unit, the motor is mounted on a sturdy pedestal, supported by a rigid base cast integral with the machine. The V-belt is adjustable through a hinged motor mounting plate.

Features of the Sibley 20-Inch Drilling Machine include wide inter-changeability, with all parts tooled for accuracy of



Sibley 20-Inch Drilling Machine

fit. High quality forged steel is used in the spindle. Spindle quills are provided with bronze oil-grooved bushings, and the Morse taper is bored in the spindle after assembly is complete. Heavy duty ball thrust bearings are provided. In addition, the construction includes large back gears.

By boring the table arm, after assembly, with the same spindle furnished on the machine, table alignment is assured. The table is held at a right angle to the spindle within 0.0007 in 6 inches.

Snap-on BOXOCKET WRENCHES

SAFE **FAST** **ADAPTABLE**

Powerful, safe leverage that invites confident wrench speed

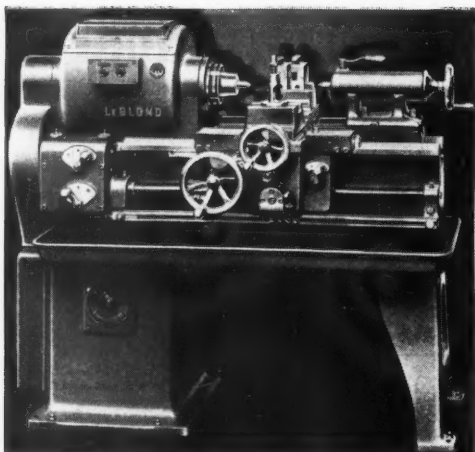
Slipping handily into hard-to-get-at places . . . engaging the nut on all *six* corners with an encircling can't-slip-can't-spread grip . . . needing only *half* the space of an end wrench for full handle movement . . . Snap-on Boxockets are *speed* tools and *safety* tools on tough nut-turning operations. Chamfered openings slip readily over the nut. Double broaching permits operation within a 15° arc. Round handles provide comfortable grip. Snap-on Boxockets work swiftly and efficiently in many spots inaccessible to other wrenches.

For maximum usefulness on a wide range of work, Snap-on offers 13 types of its popular Blue Point Boxockets — in angled, offset, combination and flare nut heads—and in standard wrench sizes from 3/16" to 4 3/4". Available through Snap-on's nationwide direct-to-user tool service.

Write for the Snap-on catalog of industrial wrenches.

SNAP-ON TOOLS CORPORATION
8032-G 28th AVE., KENOSHA, WISCONSIN

Snap-on Tools
THE CHOICE OF BETTER MECHANICS



LeBlond 13-Inch Motor Head Rapid Production Lathe

LeBlond 13-Inch Motor Head Rapid Production Lathe

The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio, has recently redesigned and is now in production on the LeBlond 13-Inch Motor Head Rapid Pro-

duction Lathe shown in the accompanying illustration. An outstanding advantage of the lathe, which is designed for light cutting at extremely high speeds, is the fact that the two essential elements of an electric motor—the stator and rotor—are built integral with the headstock. The stator is bolted to the headstock casting while the rotor is pressed onto the spindle. The motor head is designed for operation at 5 h.p. at top speed and is said to function quietly without vibration at speeds as high as 3,600 revolutions per minute.

A simple electric start-stop box is provided on the machine for control purposes. A touch of the start button sets the spindle whirling rapidly at any preselected speed. A touch of the stop button automatically brakes the spindle to a smooth, quick stop within a matter of seconds. All controls are located less than an arm's length from the operator, including the new finger-touch speed-change handle located in the

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Regrind
YOUR TOOLS
IN EXACT
CONCENTRICITY
ON ANY
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**Designed to Hold All Straight or Taper
Shank Tools from $\frac{1}{16}$ " to $1\frac{1}{2}$ " Diameter
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GRINDERS & FIXTURES Inc.**

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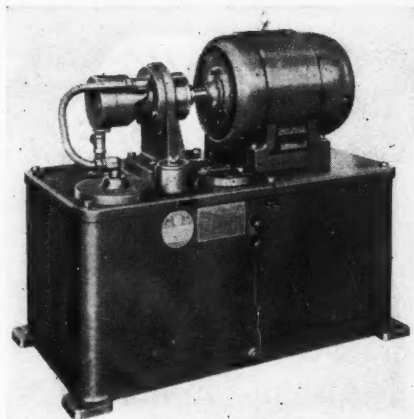
leg at the headstock end.

Various attachments such as those used on the standard 13, 17, and 20-inch LeBlond Rapid Production Lathes are also available for the new motor head. The range and scope of the machine may be further increased by special tooling for difficult production jobs.

Barnes F-10-A and F-20-A Hydraulic Units

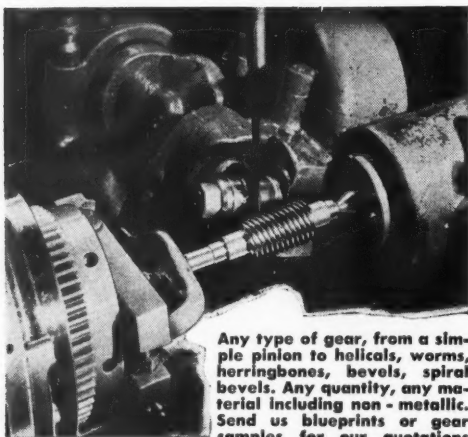
The addition of two hydraulic power units, designated as the F-10-A and F-20-A, to its line of hydraulic equipment is announced by the John S. Barnes Corp., 300 S. Water St., Rockford, Ill. On light duty machine applications, the F-10-A is claimed to provide an ideal power source. It is designed for mounting in the machine or on a separate base. Piping connections to the cylinder or auxiliary control valves complete the installation.

The Barnes F-10-A Hydraulic Unit is furnished complete with a gear pump, overload valve, motor coupling, pressure gage, and miscellaneous parts (but less motor). Pipe connections to the pump,



Barnes Hydraulic Unit

overload valve, and gage are also included as a part of the unit, specifications of which are as follows: oil capacity, 9 gallons; maximum pump delivery, 5 g.p.m.; maximum gage pressure, 500



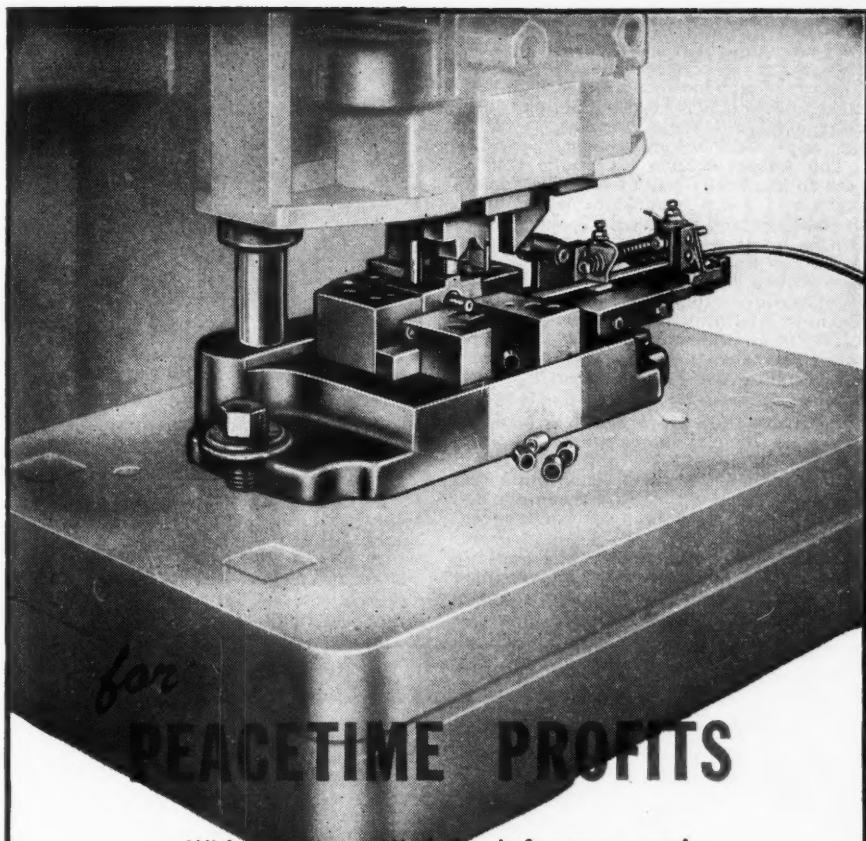
Any type of gear, from a simple pinion to helicals, worms, herringbones, bevels, spiral bevels. Any quantity, any material including non-metallic. Send us blueprints or gear samples for our quotations and delivery dates.

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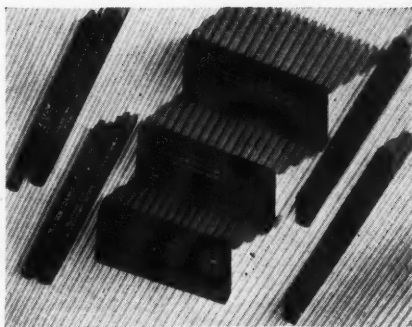
321MM Albany St., Springfield, Mass.

Hitch and Die Feeds for Automatic Punch Presses, Gauges, Stampings, Tools, Dies, Precision Parts

p.s.i.; maximum motor size, Frame No. 224; recommended motor speed, 1,200 or 1,800 r.p.m.; recommended oil, PennBell Light; recommended piping, $\frac{3}{8}$ -inch O.D. steel tubing and V.L. Graf fittings; recommended mounting position, horizontal; approximate weight, 275 pounds.

The Barnes F-20-A Hydraulic Unit is said to be ideally suited for jobs requiring 2 and 5 h.p. Considerable variation in delivery and pressure characteristics can be made within the specified limits. A Barnes Roto-Blade pump, which is direct driven by the motor, develops the fluid power. Pressure is limited by a Barnes hydraulically balanced relief valve. In addition to the tank, pump, and relief valve, the unit also includes a motor coupling, pressure gage, and miscellaneous parts (but no motor).

Specifications of the F-20-A are as follows: oil capacity, 27 gallons; maximum pump delivery, $12\frac{1}{2}$ g.p.m.; maximum gage pressure, 1,000 p.s.i.; maximum motor size, From No. 284; recommended motor speed, 1,200 or 1,800 r.p.m.; recommended oil, PennBell Light; recommended piping, $\frac{3}{8}$ -inch O.D. steel tubing and V.L. Graf fittings; recommended mounting position, horizontal; approximate weight, 675 pounds.



Cratex Abrasive and Polishing Blocks and Sticks

Cratex Abrasive and Polishing Blocks and Sticks

The Cratex Manufacturing Co., 81 Natoma St., San Francisco, Calif., announces the addition of abrasive and polishing blocks and sticks to its line of rubberized products.

The blocks and sticks are specially designed for removing rust, slight blem-



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**SMALL FINE PITCH GEARS FROM
1/16" DIA. UP TO 220 DP. HELD
AS CLOSE AS .0005"**

Actual gear production requirements such as these, with forms and sizes shown exaggerated, are only a few typical examples of work produced by Beaver Gear craftsmen. Finely finished, accurate blanks are prepared and inspected, providing controlled quality all the way through the final gear cutting operation. Consult Beaver Gear Engineers for your precision

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supplies, as well as
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BAND SAW BLADES
REZISTOR AND DUPLEX
HACK SAW BLADES

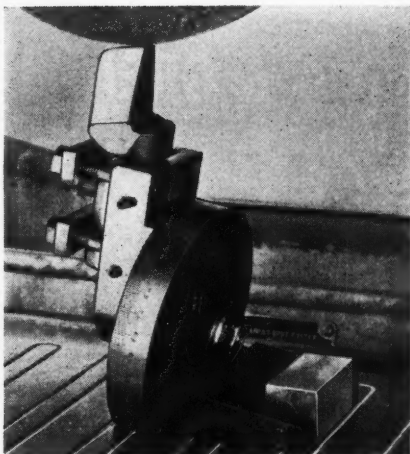
THE HENRY G. THOMPSON & SON CO.

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NEW HAVEN 5, CONNECTICUT, U. S. A.

ishes, heat marks, or stain, but can also be used to clean and polish molds^o and remove burrs from light castings.

Scherr All-Purpose Tool Grinding Fixture

The George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., announces the development of an all-purpose tool grinding fixture for the precision grinding of lathe tools, screw machine form tools, shaper, planer, milling



Scherr All-Purpose Tool Grinding Fixture

**Here's Why FORTHMAN SCRAPERS
provide FINER FINISHES FASTER!**



Forthman Scrapers are tipped with super-hard CARBOLOY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

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- ... finer finishes faster!

Furnished ground or unground. Write today for prices and specifications.

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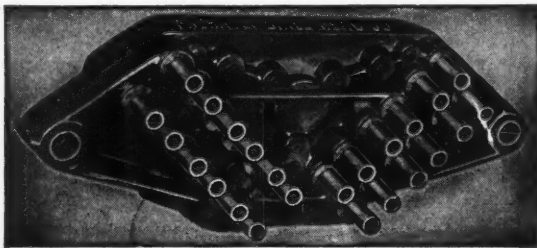
CLIFF J. FORTHMAN

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Pictured: a 24-Spindle Heavy-Duty Drill Head.

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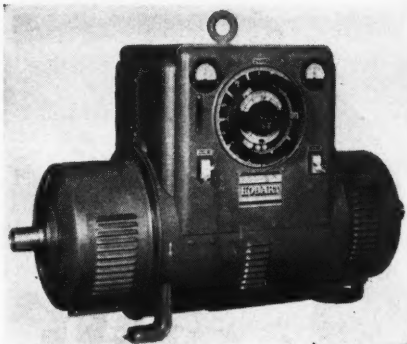
angle surface on the main casting. In like manner, the 5, 7, and 10-inch degree clearance angles are obtainable.

The Scherr All-Purpose Tool Grinding Fixture may be used to grind tools from $\frac{1}{8}$ to $1\frac{1}{4}$ inches and is particularly recommended for use in grinding carbon, alloy, and tungsten carbide tool bits. Both inside and outside threading and recess tools may be ground on the fixture, and form tools may also be ground with different cutting edges for various types of material.

Hobart Synchronous Motor Welder

By utilizing the inbuilt separate exciter of the Hobart electric drive welder, The Hobart Brothers Co., Troy, Ohio, has produced a compact, high performing synchronous motor welder which is so proportioned that it can be started across the line and is arranged to automatically synchronize itself by the build-up of the separate exciter. The manufacturer recommends that the unit be operated to draw leading current at no load so as to compensate for other low power factor loads.

The motor of the welder is a Hobart



Hobart Synchronous Motor Welder

revolving field synchronous type and is furnished with a heavy squirrel cage winding so as to provide for easy starting. Once up to speed, the exciter builds up and automatically applies correct excitation to the motor fields.

When desired, the Hobart Synchronous Motor Welder can also be used as an a.c. generator for the operation of small tools, lathes, grinders, and so on. For



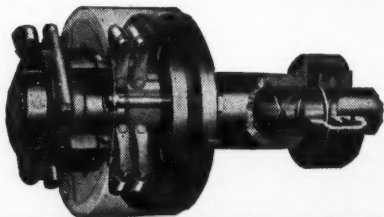
PUT A WATCH DOG ON YOUR OIL BARREL

You can eliminate many unnecessary trips by your men to the Oil Barrel for lubricant, if you use MULE-PULL CLUTCHES. Unlike other types they have an ANTI-FRICTION, ROLLER-LEVERAGE SYSTEM that requires no lubrication whatever. The Loose-Pulley Sleeves of these Clutches have ECONOMICAL RING-OILING LUBRICATION that is copious without waste and proportional to the speed. One application of oil lasts from 30 to 90 days and you are protected

at all times against scored Shafting and ground-out Loose-Pulley Sleeves, together with the costly shutdowns that accompany such failures.

**MULE-PULL
CLUTCHES**

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BROWN ENGINEERING CO.

120 NORTH 3RD ST.

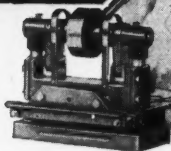
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METAL Stampings

**DUPLICATED
WITHOUT
DIES**

With DI-ACRO Precision Machines

If you desire to save time and die expense on production of metal stampings or other small parts, then the DI-ACRO System of "Metal Duplicating Without Dies" merits your consideration. It is based on the rapid and accurate production of formed parts with DI-ACRO Shears, Brakes and Benders. All duplicated work is accurate to .001". These precision machines are adaptable to an endless variety of work, and ideally suited for use by girl operators. For short runs your parts are processed in a matter of hours instead of waiting weeks for dies.



SHEARS



BRAKES



BENDERS

SHEARS

DI-Acro Shear squares and sizes material, cuts strips, makes slits or notches, trims duplicated stampings. Shearing width—Shear No. 1—6". Shear No. 2—9". Shear No. 3—12".

BRAKES

DI-Acro Brake forms non-stock angles, channels or "Vees." Right or left hand operation. Folding widths: Brake No. 1—6". Brake No. 2—12". Brake No. 3—18".

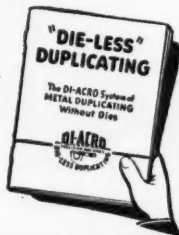
BENDERS

DI-Acro Bender bends angle, channel, rod, tubing, wire, moulding, strip stock, etc. Capacity—Bender No. 1— $\frac{3}{4}$ " round cold rolled steel bar. Bender No. 2 and No. 3— $\frac{1}{2}$ " cold rolled steel bar.

Send for Catalog

"DIE-LESS DUPLICATING"

It illustrates many stampings or parts made without dies, gives full details on DI-ACRO machines and shows how they may readily be adapted for various applications. Request your copy now.



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this purpose, the shaft of the welder is coupled to a gasoline or electric motor, with the synchronous motor then becoming an a.c. generator.

Watson-Stillman 1-Oz. Injection Molding Machine

Designed to relieve larger type equipment of experimental work and to make molding from small single-cavity dies as economical as possible on short runs, the Watson-Stillman 1-Oz. Injection Molding Machine illustrated herewith has

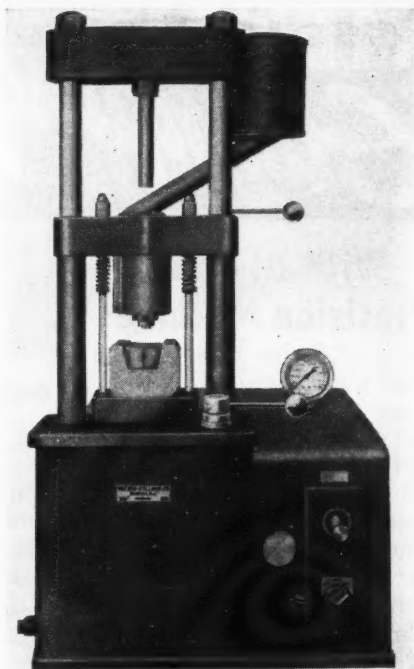


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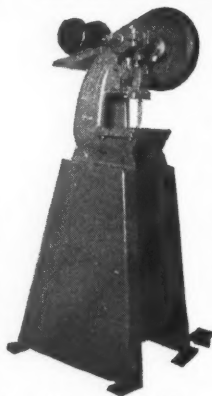
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Reduce Production Cost on small work, or on jobs requiring frequent setups.

Floor or bench models.

Prompt Delivery.

No. 0 4½-TON CAPACITY

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The Service Machine Co.

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been brought out by The Watson-Stillman Co., Roselle, New Jersey.

The machine is completely self-contained and fully hydraulic and is powered by means of a vane type pump. A micro-valve is provided for controlling pressure steplessly to a maximum of 1,200 lb. Positive alignment of the nozzle with the sprue opening in the die is assured through a dowel arrangement.

Standard equipment of the Watson-Stillman 1-Oz. Injection Molding Machine includes a thermostatic control for the heating cylinder. An indicating temperature control is among the optional equipment available for the machine.

Bristol Bellows-Differential Flow Meter

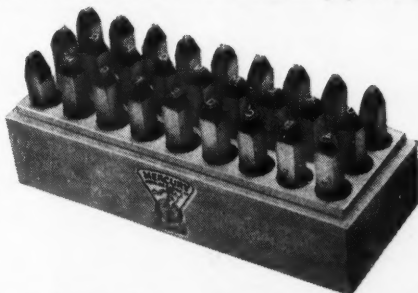
The Bristol Co., Waterbury 91, Conn., announces the addition of a bellows-differential flow meter to its line of mer-



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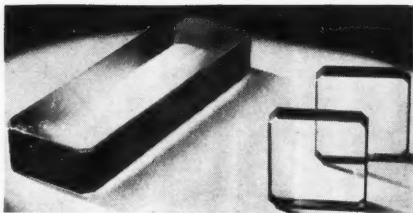
MERCURY METAL DIE AND LETTER CO.
546 EAST 16TH STREET, LOS ANGELES 15, CALIFORNIA

cury manometer flow meters. The instrument is available as a mechanical flow meter, as an electric flow meter, and as a pneumatic-transmission flow meter in a complete range of recording, indicating, integrating, and automatic controlling models.

The meter body, operating on a new principle, is said to require no mercury in its operation. A unique method of transmitting bellows motion to the pen arm is employed which is claimed to completely isolate the meter body shaft from the measured fluid.

Optron Optical Flats

The checking of gage blocks, anvils, sealing surfaces, and other precision articles for flatness, size, and parallelism is said to be effected simply, accurately, and conveniently by the use of the square and rectangular optical flats now being marketed by the Optron Laboratory, 2660-B Salem Ave., Box 25, Dayton 6, Ohio. The straight edges of the flats, which are unusually light and easy to handle, provide reference lines for the comparison of straightness of interference bands,



Optron Optical Flats

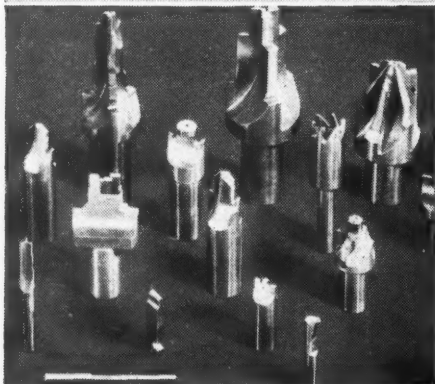
often making it unnecessary to use rules or straightedges, according to manufacturer.

The Optron Optical Flats are said to be guaranteed flat within 1/10 wave (2 millionths of an inch) and are furnished square up to 6 x 6 inches or in bars up to 10 inches x 2 3/4 inches.

Westcott Light Duty Chucks

Threaded for lathes having 1 1/2-inch 8-thread spindles, two light duty chucks designated as the Styles 6900 and 5900

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NEW PRE-SHARPENED SHEARCUTTER TOOL BIT

Actual photograph of a 3/8" SHEARCUTTER Tool Bit in production taking a finishing cut 1 1/8" deep under power feed. (3" Diameter C. R. S., 300 RPM, .005 Feed, Cutting Speed 240 FPM.)

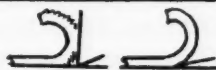


THIS AMAZING NEW INVENTION—

- Saves from 10% to 50% on labor costs.
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- Generates less heat and saves on cutting compounds.
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- Gives smoother finish and greater accuracy.
- Fits standard tool holders.
- Is interchangeable with less efficient tool bits.
- May be used on ferrous and non-ferrous metals, alloys and plastics.

YOU CANNOT AFFORD NOT TO USE THESE TOOL BITS!!

PATENT WARNING!
Protected by numerous patent applications. Infringers will be prosecuted.



THE SHEARCUTTER PRINCIPLE
Illustrated at left is the conventional type of tool bit, breaking down or tearing the metal. At right: The slicing knife-like action of Shearcutter Tool Bits.

FEARLESS TOOL CO.

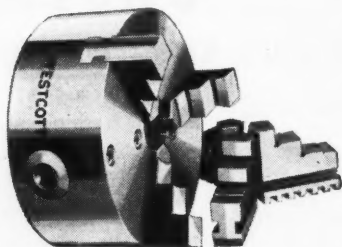
1234 S. GRAMERCY PLACE, DEPT. A, LOS ANGELES 6, CALIFORNIA
DISTRIBUTORS WANTED

are announced by the Westcott Chuck Co., Oneida, N. Y. The Style 6900 is a universal type having a high strength semi-steel body. The jaws are of hardened steel, with steps and bites carefully ground for accuracy. The scroll is of special heat-treated alloy, and the pinion is made of steel which is heat treated after machining.

The Style 6900 chuck is available in 5 and 6-inch sizes and is supplied complete with a wrench.

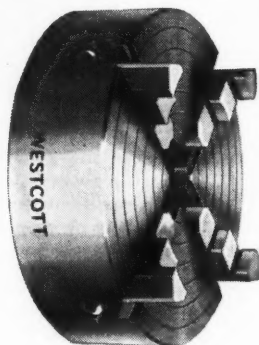
The Style 5900 Chuck is an independent type having a high strength semi-steel body. The jaws are of hardened and

ground steel, and the screws are made of alloy steel, heat treated and threaded full length except where necked for bearing.



Westcott Style 6900 Light Duty Chuck

ing. The design also includes heat-treated steel thrust bearings which are tightly fitted into the body.



Westcott Style 5900 Light Duty Chuck

The Style 5900 Chuck is available in one size of 6 inches and is supplied complete with a wrench.



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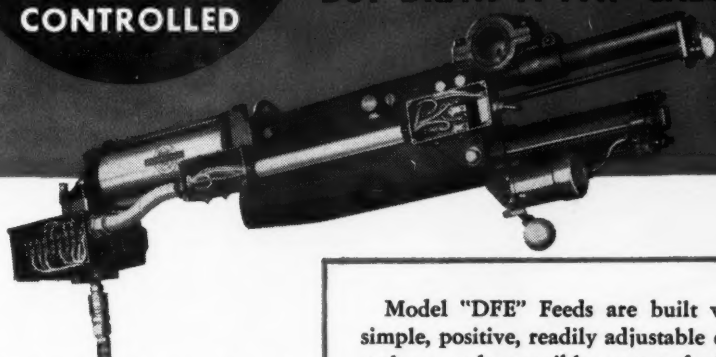
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GRINDING CO.
6605 Cedar Ave., Phone: EN 3412, CLEVELAND 3, O.

Moore 3-Way Parallel Set-Up Blocks

A set of 3-way parallel set-up blocks which can be used to provide up to 12 different heights has been developed by the Moore Special Tool Co., Inc., Bridgeport, Conn. The set consists of six blocks each of two sizes 1 x 2 x 3 inches

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DRILL PRESS FEED
WILL DO EVERYTHING
BUT DRAW A PAY CHECK!**



Answer to today's problem of extra production from each cost dollar, Bellows-Senacon DFE Drill Press Feeds will substantially increase production on drill press operations: drilling, tapping, reaming, fly-cutting, or others.*

This new electrically controlled feed makes possible such operations as continuous cycling, dwell control ranging from 2/10ths of a second to 180 seconds, automatic drill cleaning, or deep hole drilling, and operations of one, two or more feeds synchronized with a single work holding fixture.

** Designed primarily for Drill Press operation, Bellows-Senacon Feeds are readily adaptable to Milling Machines, Threaders, Grinding Machines, etc.*

Write Today . . .

Write today for Bulletin DF-102 and the full story how you can boost drill press production 40% to 500%

Model "DFE" Feeds are built with simple, positive, readily adjustable controls to make possible correct feeding rates, power thrusts, etc., for virtually any tool, working in virtually any stock. Independent speed controls permit infinite variation of feed and traverse rates. Feeding thrust can be varied to any desired degree. The Bellows Hydro-Check, an adjustable hydraulic resistance unit (optional equipment) assures utmost smoothness of feed, permits checking the feed at the point of breakthrough or at any other predetermined point. Three models with stroke lengths permitting one and one-half, one, or one-third revolutions of the drill press shaft.

The Bellows Co.

SENACON DIVISION

861 E. Tallmadge Ave., Akron 10, Ohio

CHICAGO STEEL PRESS BRAKE

New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

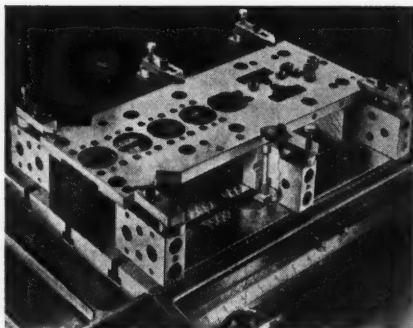
USE FOR

1. FORMING
2. EMBOSSING
3. MULTIPLE PIERCING
4. NOTCHING
5. BLANKING

The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

DREIS & KRUMP MFG. CO.

7418 LOOMIS BLVD. • CHICAGO 36
ILLINOIS



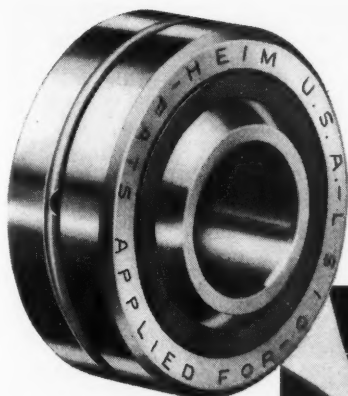
Six Moore Set-Up Blocks spaced along the sides of a long rectangular piece to maintain uniform support

and $\frac{7}{8} \times 1\frac{1}{4} \times 1\frac{1}{2}$ inches, packed in a mahogany box for operator convenience in working out any combination of sizes for any particular application. Each block can be used in any of its three dimensions.

Originally designed for precision work on the Moore jig borer and Moore jig grinder, the blocks are equally adaptable for large or small work in the toolroom, on production jobs, or for inspection. The blocks are drilled and counterbored for bolting to the machine table or faceplate and, it is claimed, will not slide off when attaching work to a vertical

Moore 3-Way Parallel Set-Up Block Set





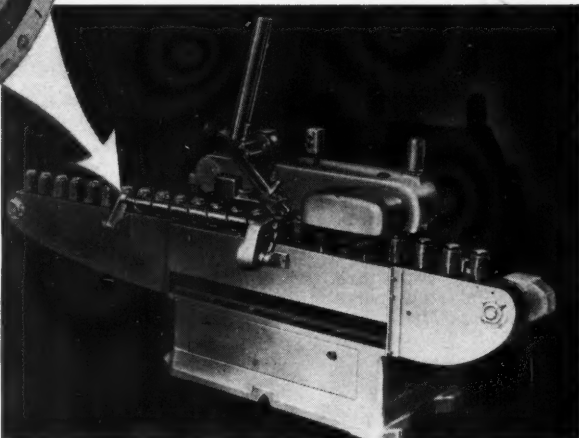
HEIM UNIBAL



SPHERICAL BEARINGS

As used in the NEW ANCHOR STERISEAL MACHINE

The Anchor Hocking Glass Corporation, Lancaster, Ohio, supplies the new Anchor Steriseal Machine to food packers for high production steam vacuum sealing of glass containers with Anchor AH-N Caps. A small, but important part of this machine is the Heim Unibal Spherical Bearing used to support one end of the Helicoid Timer.



HEIM UNIBAL SPHERICAL BEARINGS *for correction of misalignment*

Developed during the war for exclusive use in airplane construction, the unusual principle used in making the Heim Unibal Spherical Bearing is meeting with enthusiastic approval by American Industry in general. Using only one ball instead of a double row of balls in a race, a greater surface supporting area is presented and heavier loads can be carried without breakage. Longer life at lower initial cost, coupled with the self aligning feature of this new type of bearing make it a must for today's production needs.

**HEIM
also makes
UNIBAL
ROD ENDS**

PLEASE WRITE FOR

CATALOG NO. 11

**THE HEIM
FAIRFIELD**



**COMPANY
CONNECTICUT**

surface such as a micro-sine plate, a rotary table when used for radial spacing, or a lathe faceplate. Tapped holes on all three sides for supplementary straps permit work to be supported parallel or perpendicular to working surfaces.

Six Moore Set-Up Blocks can be appropriately spaced around a large circular workpiece or along the sides of a long rectangular piece to maintain uniform support, eliminate sagging, localize stresses, and hold the work rigidly throughout the machining operation. The blocks may also be placed to avoid interference with holes being bored or ground. Moreover, the work may be set at a sufficient height to measure the bottom of holes otherwise inaccessible.

Since Moore Set-Up Blocks are perpendicular, they may be employed as angle irons. They may also be substituted for gage blocks, if too great dimensional accuracy is not required.

Small and compact in design, Moore Parallel Set-Up Blocks are precision manufactured from carburized chrome-nickel steel and are finish ground to tolerances of plus 0.0002 inch and minus 0.0000 inch. Sizes are parallel within 0.0001 inch and perpendicular within 0.0002 inch, thus assuring interchange-

ability between blocks in different sets in case more than one is used. The following heights can be built up using not more than two blocks: $\frac{3}{8}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$, $4\frac{1}{4}$, and $4\frac{1}{2}$ inches.

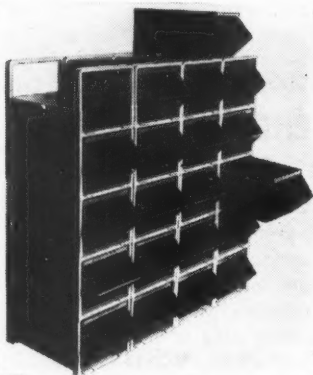
Anker-Holth Non-Rotating Hydraulic Cylinder

Available in 11 sizes and 7 standard mountings, a hydraulic cylinder of non-rotating design is now being offered by



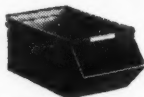
Anker-Holth Non-Rotating Hydraulic Cylinder

the Anker-Holth Manufacturing Co., 2731 Conner St., Port Huron, Mich. Outstanding features claimed for the cylinder include absence of tie rods; cush-



STACKBINS
IN
STACKRACKS

REDUCE HANDLING of Tools, Parts and Materials



STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly of tools, parts and materials.

STACKRACKS are individual units which lock together to form racks of any size, shape or capacity. Stackbins slide like drawers in Stackracks.

Because Stackbins are portable containers—not fixtures—tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed—without disturbing any other bin.

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa

Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN

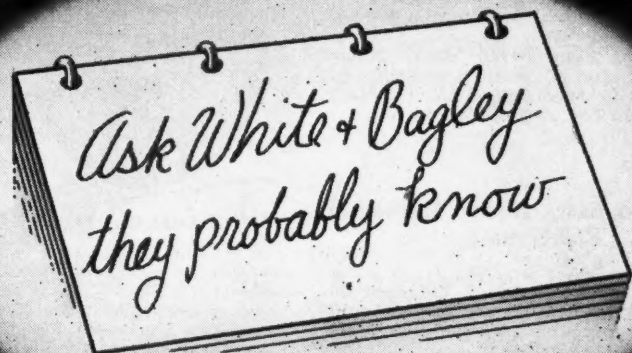


SYSTEM

"Stacked and

Still Accessible"

FOR KEENER GRINDING



ECONOMY

**Grinding and Cutting Oils and Lubricants
for Every Metal-Working Purpose**

THE WHITE & BAGLEY COMPANY



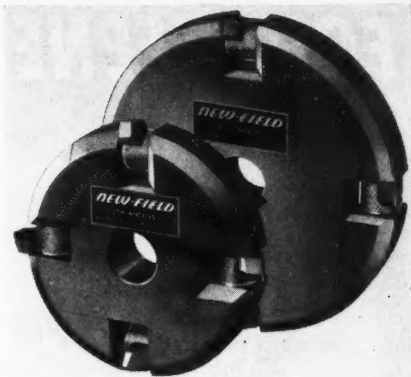
WORCESTER, MASSACHUSETTS

ioned design at no increase in overall length; two-way action; extra sturdy construction; one-piece step-seal piston ring; and 6-to-1 safety factor

Applicable for oil or water service, the Anker-Holth Non-Rotating Hydraulic Cylinder is designed for low pressures up to 750 p.s.i. and high pressures from 750 to 2,000 p.s.i., and is available in sizes ranging from 1½ to 8-inch bore. These sizes are standard in the following mountings: foot, trunnion, center line, clevis, flange (rod end), flange (blind end), and adapter. Any length of stroke can be furnished with standard-rod, oversize rod, or double-end rod.

New-Field Extra Heavy Universal Fly Cutters

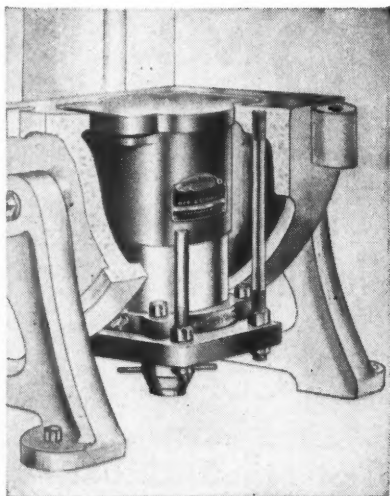
Two extra heavy models of the New-Field Universal Fly Cutter, designed especially for application on shell end mill arbors, are announced by the New-Field Machined Parts Co., 549 W. Randolph St., Chicago 6, Ill. The cutters are 1½ inches thick and 6 inches and 8 inches in diameter respectively, thus providing ample



New-Field Extra Heavy Universal Fly Cutters

strength for machining driving slots and counterbores.

Like other models, the New-Field Extra Heavy Universal Fly Cutters each utilize four removable high speed steel or carbide bits. They are supplied in all standard arbor sizes which can be machined to fit any individual arbor.



Die Cushions

for

Every Punch Press Requirement

For deep drawing operations.

For pressure pad control on form dies.

For stripping blanks and ejecting slugs.

Write for Engineering
Catalog No. 100-12.

**DAYTON ROGERS
MANUFACTURING CO.**
Minneapolis 7, Minnesota

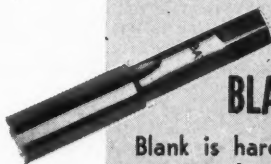
We're Making Haste Slowly

We're using every means at our command to fill your orders for Bath Taps. But we will not sacrifice quality to meet this demand. Bath Taps are still "ground from the solid **after hardening.**"



BAR

Steel bar is cut off, centered, turned; flutes are milled; tap is squared and stamped.



BLANK

Blank is hardened in the solid to assure uniform metal structure from core to cutting edge.

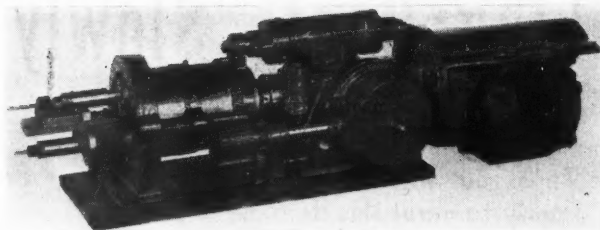


TAP

Shanks, major diameters and flutes are ground on centers. Then, threads are ground from the solid on Bath patented equipment.

RESULT: *Accurate,
hard, long wearing tap.*

JOHN BATH & CO., WORCESTER, MASS.



Millholland Automatic
Drilling and Tapping
Unit

Millholland Automatic Drilling and Tapping Unit

The accompanying illustration shows an automatic drilling and tapping unit developed by the W. K. Millholland Machinery Co., 1048 Fairfield Ave., Indianapolis 5, Ind., for drilling and tapping pipe plug holes in automobile rear axle housings and similar parts, in one handling, in connection with other operations performed at the same time. The unit consists of a standard Millholland motor-driven automatic work unit with a two-spindle head attached and supported in a housing mounted in the same base plate with and operated by the unit.

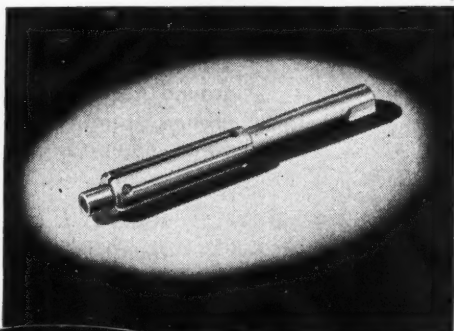
The Millholland Drilling and Tapping

Unit has an automatic operating cycle which is started by remote control from a solenoid valve. The operation for drilling and tapping consists of rapid approach of the drill to the work slow-down feed for drilling, rapid return, index 180 degrees, rapid advance of the tapping spindle, slow-down for tapping operation, reverse of the tapping spindle, back out, rapid return to back position, index 180 degrees, and stop, leaving the drilling spindle in the correct position. The automatic drilling and tapping unit is mounted on the base of a double-end boring and reaming machine rear axle housing and the drilling and tapping operation is performed automatically, while the other operations are underway on the ends. When the work is loaded into the fixture and the operation of boring is started, the drilling and tapping operation is automatically begun



- Just a dozen Champion Expanding Mandrels will do the work of
- hundreds of solid mandrels and
- cost you only about one-fifth as much! Champions completely
- and accurately fill holes in the
- $\frac{1}{2}$ " to $6\frac{1}{2}$ " range, with infinite
- variations . . . hold work of any
- length bore; maintain close tolerances; and release work easily.
- Made in two simple parts—a
- flexible round sleeve and a taper
- arbor—of top-quality, heat-treated
- steel, Champions efficiently handle
- all hard and soft metals, on all
- large and small jobs. You can
- depend on Champions.

Expanding Mandrels



The **WESTERN** Tool and Manufacturing Co. Inc.
SPRINGFIELD, OHIO

Stocked by Leading Industrial
Supply Distributors from
Coast to Coast



The simplified design of the Namco RST Collapsible Tap, with its circular ground thread chasers, guarantees both speed and accuracy.

Collapsing action at end of cut is quick and positive. Hardened and ground throughout, for precision and long life.

Changing chasers is a one-minute job, without changing the setup—production resumes immediately, without

“cutting and trying”. Chasers may be reground through 270°—they last 20 to 50 times longer.

To use as a revolving tap, simply remove handle—this double-duty feature saves tool investment.

Here is an important production tool—a money saver for your shop. Capacities 3" to 5". Catalog B-42-C gives full details.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-B and B Spindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog • Limit Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing

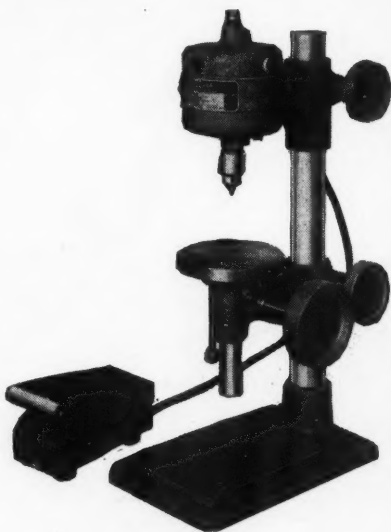
by electrical control, and the operations of drilling and tapping are completed by the time the boring operation is finished.

The Millholland Automatic Drilling and Tapping Unit is available in sizes up to 3 horsepower.

Dumore High Speed Bench Drill

Designed particularly for use in the fabrication of small metal, wood, or plastic items and equipment, a lightweight high speed bench drill for $\frac{1}{8}$ -inch and

smaller drills is announced by The Dumore Co., Racine, Wis. The drill head is firmly held in the desired position on



Dumore High Speed Bench Drill

the polished solid steel column with a locking device, and rigidly holds the motor in place, yet permits vertical adjustments and a 360-inch degree radius of action. The table is mounted in like manner.

The drilling operation is performed through the use of a hand control geared to the table—an arrangement which is claimed to be of particular advantage in obtaining the proper work-feeding speed. Power is supplied by a 1/30 h.p. motor

BRADFORD METALMASTER LATHES

14 $\frac{1}{2}$ " - 16 $\frac{1}{2}$ " - 18 $\frac{1}{2}$ " Swing

TOOLROOM AND ENGINE TYPES

... Also ...

CAM FEED

UNIT TYPE

DRILLING AND
TAPPING
MACHINES

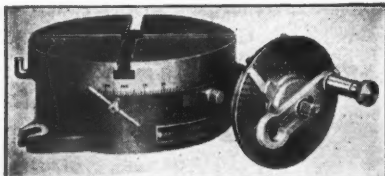


1840 - 1945

The Bradford Machine Tool Co.

Evans at 8th St.

Cincinnati 4, Ohio



7 $\frac{1}{2}$ in. Rotary Table for Small Miller Tables

Send for circular.

STEVENS ROTARY TABLE DIAL INDEXING TYPE

Table graduated for single degree reading. Worm can be disengaged for turning table by hand.

Other sizes 12", 18" and 24" diameters.

JOHN B. STEVENS INC.

482 CANAL ST.

NEW YORK 13, N. Y.

GRENBY HYDRAULIC GRINDING MACHINES

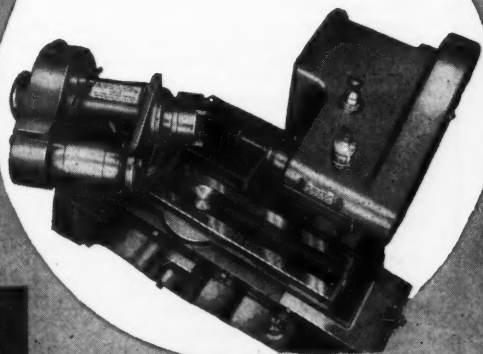
FEATURES

- Infinitely Variable Longitudinal Traverse
- Hydraulic Cross Feed
- Coolant
- Precision Spindles
- Heads Swivel For Angle Work
- Grinding Heads To Convert For Internal Grinding (See Cut)

EG103 SPECIFICATIONS

Work Capacity—3" Dia. x 10" Length
 Workhead Accommodates—Collets 1" Max. Hole
 —Chucks & Face Plates 4" Max.
 Floor Space & Wt. 1, Long x 25" Wide—1600 lbs.

THE
**GRENBY MANUFACTURING
 COMPANY**
 PLAINVILLE, CONNECTICUT



with a range of from 2,000 to 15,000 r.p.m. The speed is controlled by a foot rheostat, thus permitting free use of both hands for the drilling operation.

The Dumore High Speed Bench Drill weighs 15 lb., thereby making it readily portable or enabling it to be permanently mounted to a bench, if desired.



Keller Insert-Removing Tool

Keller Insert-Removing Tool for Plastics Industry

A fast operating, unusually powerful insert-removing tool for the plastics industry has been developed by the Keller Tool Co., Grand Haven, Mich. Said to reduce insert-removal time and operator fatigue in a wide variety of plastic molding jobs, the tool is available in two models designated as the 1458 and 1459.

Designed for use in molding operations where unusually high power is required, the Model 1548 has a torque of 8 foot-pounds and a socket speed of 300 r.p.m. The Model 1459 is intended for lighter work where less power and more

speed are required. This model has three times the speed of the Model 1458 and a 2 foot-pound torque. Both models can be operated in either direction and each weighs 2½ pounds.

An outstanding feature of the Keller Insert-Removing Tool is the broached-through socket with ⅜-inch square hole which allows for the insertion or removal of both internally and externally threaded inserts.

Ram Type Turret for Axelson 20-Inch Lathe

A heavy duty ram type turret to fit its standard 20-inch lathe is now being offered by the Axelson Mfg. Co., 6160 S. Boyle St., Los Angeles, Calif. Made to

SMALL • EFFICIENT • INEXPENSIVE • PRACTICAL

DUCON UNIT-TYPE DUST COLLECTOR for dust control at machines

Dust is a serious health hazard and wears out machinery bearings needlessly. DUCON solves these problems by stopping all the dust.

Compactness is combined with efficiency in DUCON design which features multiple numbers of cloth filter bags to provide maximum filter area to air flow.

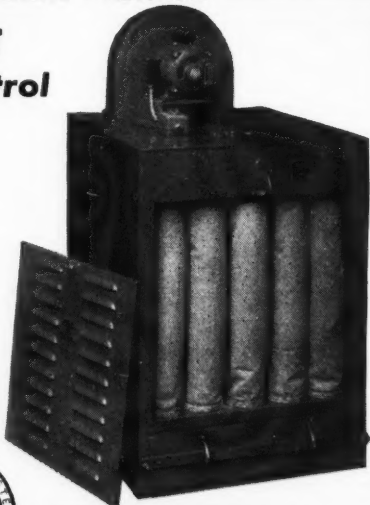
Filter bags readily cleaned by positive shaker and the dust thus dislodged drops to and accumulates in receptacle pan at bottom of unit. DUCON cloth filter bags last indefinitely providing low cost dust control without constant maintenance.

Complete information given in Bulletin No. 243. Ask for your copy.

THE DUCON COMPANY

Air and Gas Washers—Cyclones
—Dust Control Systems

259 Norman Avenue
Brooklyn 22, N. Y.



DUCON Unit showing filter bag arrangement.
Capacities 200-800 Cubic Feet of Air per minute—four standard sizes.



SELECTIVE CARBURIZED
AND HARDENED TO
EXACTING
SPECIFICATIONS

AIRCRAFT QUALITY FINISH
13 MICRO-INCH FINISH ON
O. D. 4 MICRO-INCH
FINISH ON I. D.



Know-How IN PRODUCTION

It's a matter of record that, when certain of the country's largest manufacturers need hardened and precision ground parts that must adhere rigidly to quality specifications, they rely on Allied to produce them.

A typical part is shown above. It is made from AMS-6260 steel and selective carburized and hardened. On no surface can there be decarburization, nor is carburization permitted on the surfaces which remain soft. 60-63 C Rockwell is required for the hard portions. All tool marks must be removed, and the main outside diameter and the in-

side diameter call for specific and exceptionally fine surface finish.

Whether your parts may be difficult or simple, Allied can produce them for you . . . right . . . economically . . . and on time. Submit your part prints to us and we will offer our quotations without delay.

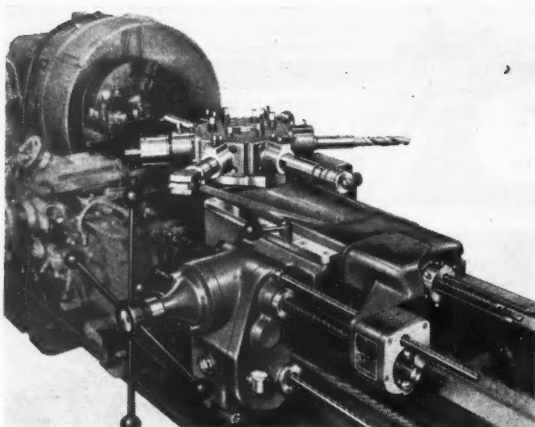
ALLIED PRODUCTS CORPORATION

DEPARTMENT 7-A

4624 LAWTON AVENUE
DETROIT 8, MICHIGAN

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES





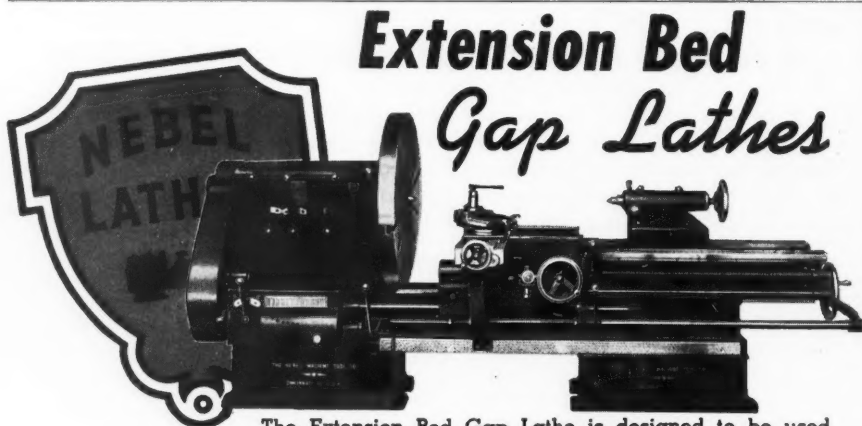
Axelson 20-Inch Lathe Equipped
with Ram Type Turret

the same heavy duty specifications as the lathe and designed to handle any work within the capacity of the machine, the turret is available with hand feed only or with full power feeds. Lead screw threading is also available with the power feed.

All shafts of the turret are mounted on ball or roller bearings, and power oil-

ing is provided from the apron oil sump to the slide and to the turret. The ram operates on hardened and ground steel slides and has tapered steel gibs for adjustment. An automatic reverse clutch in the apron causes the ram to feed in the proper direction regardless of the direction of feed rod rotation. The six station turret rotates on tapered roller bearings and is automatically indexed and clamped. When it is not needed, the turret can be removed from the machine or run back out of the way.

The lead screw threading attachment receives its power directly from the apron gearing and features quickly interchangeable lead screws and nuts which can be changed with a minimum of tools and without disassembling any mechanism. Opening of the half nuts may be effected by hand or by the same indexing



Illustrated is the Series "AG" 20/40" Extension Bed Gap Lathe. Also made in 28/50" Heavy Duty.

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes.

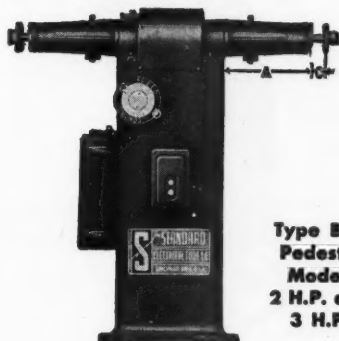
Write for circulars.

The Nebel Machine Tool Co.
CINCINNATI OHIO

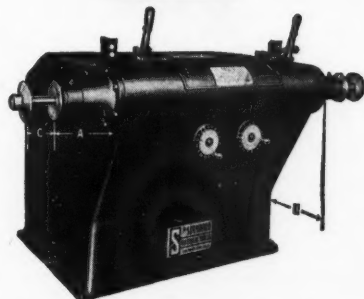
BUFFING AND POLISHING MACHINES

1500 to 3000 r.p.m., Instantly!

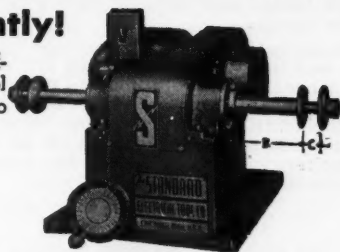
The Standard Infinitely Variable Speed Buffer and Polisher with its *Speedial Control* gives you any spindle speed from 1500 to 3000 r.p.m. instantly.



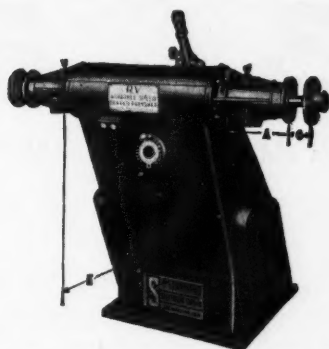
**Type BVP
Pedestal
Model.
2 H.P. and
3 H.P.**



**Type R2V. Independent Spindles.
Two 5 H.P. or two 7½ H.P.
Motors.
(Each operator is independent of
the other.)**



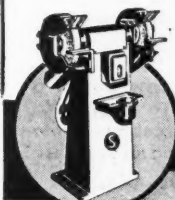
**Type IBVB 1 H.P. Bench Model
Also furnished in Pedestal Model.**



Type RV 5 H.P. and 7½ H.P.

**8 MODELS FROM 1 H.P.
TO 15 H.P.**

- Maintains peripheral speed throughout wheel life.
- Gives you maximum usable wheel life.
- Lower production costs.
- Higher production.



The STANDARD ELECTRICAL TOOL Co.

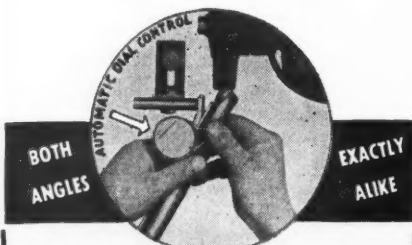
CINCINNATI - 4 - OHIO

2487 RIVER ROAD

**WRITE FOR
BULLETIN B2.**

stop mechanism which releases the feeds. Because of the apron reversing clutch, either right or left-hand threads of the same lead can be cut with the same right-hand leader and nuts by reversing the lathe spindle.

Specifications of the ram type turret are as follows: size across hex of turret, 11 inches; diameter of holes in turret (to accommodate No. 5 Warner & Swasey toolholders), 1 3/4 inches; ram feeds, 54 from 0.003 to 0.185 inch; length of cut, 14 inches; width of ram slide, 10 1/2 inches; length of base, 24 inches.



with MAJESTIC DRILL SHARPENER

Now you can always have perfectly sharpened, fast-cutting drills that really take the proper bite and cut smoothly without chatter. Simply turn the Automatic Dial Control, and the Majestic Drill Sharpener is set to grind both cutting edges and both angles exactly alike. Takes any size drill from 5/32" to 1", straight or No. 2 taper shank up to 15". Fits any grinder. Adjustable for hard or soft materials. The Majestic Drill Sharpener is a real production tool that assures longer drill life, speeds up the work and quickly saves its cost in factories, garages and repair shops. Ask your supply house, or we'll ship it to you postpaid for \$9.50. Many thousands in use. Circular on request.

Dealers, Jobbers: Write for information.

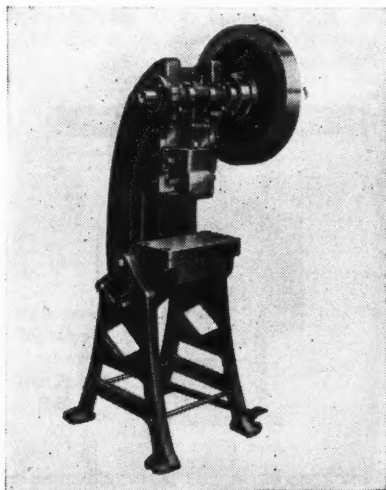
MAJESTIC DRILL SHARPENER CO.

1104 2nd Ave. So.,

Minneapolis 2, Minn.

Diamond Nos. 12 and 14 Power Punch Presses

Two inclinable open-back power punch presses designated as the Nos. 12 and 14 and with rated capacities of 12 and 14 tons respectively are announced by the



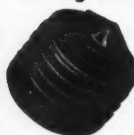
Diamond No. 12 Power Punch Press

Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif. Each press features a 6 1/2-inch opening in the back of the frame and can be inclined 40 degrees. The bed area is 8 x 15 inches and the bed opening 5 x 7 inches for both models. The standard stroke of the No. 12 is 1 1/2 inches and for the No. 14, 2 inches. An additional stroke length up to 3 inches can be provided for either press on special order.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 1/8" to 1" diameters. Send for pricelist.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

There's a Lot of Low-Cost Grinding In These Bay State Wheels

The widespread use of Bay State Grinding Wheels throughout industry is conclusive proof of their economy and versatility. Add the qualities you'll find in *every* type of Bay State Wheel — fast, cool, clean cutting — and you have the formula for consistently higher performance in countless everyday grinding jobs.

They'll last longer, too, because of their especially strong bonds. On top of that, Bay State's "controlled porosity" (uniform grain-spacing) and "fractional grading" (tripling the usual hardness

range) make it possible to meet your specifications with extreme closeness — and to duplicate them more exactly when you reorder.

These extra advantages will pay off in every one of *your* grinding operations . . . will bring you worthwhile savings in time, labor and money.

Specify Bay State Wheels for better grinding — always.

BAY STATE ABRASIVE PRODUCTS CO.
8 Union Street, Westboro, Mass.
Canadian Plant: Brantford, Ontario



Top Performance Consistently Duplicated



REAMERS ROGERS

SINCE 1885



Adjustable for wear.

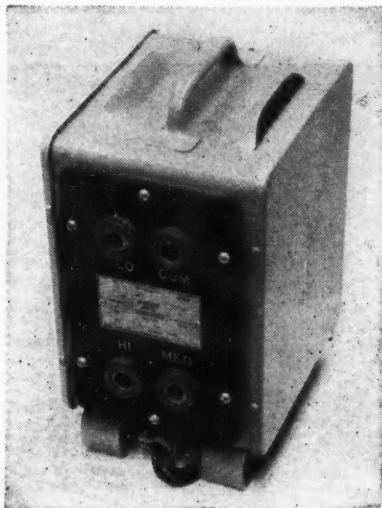
**JOHN M. ROGERS
TOOL CORP.**

Gloucester City, N. J.

Compactly and rigidly constructed, the Diamond Nos. 12 and 14 Power Punch Presses each require a floor space of 28 x 28 inches. The weight of the No. 12 is approximately 1,200 lb. and that of the No. 14, 1,250 lb. Standard equipment of each press includes a plain bolster plate; 4 bolts, nuts and washers; and two adjusting wrenches.

Westinghouse 5 Kva Portable Brazier

For making lap joints in copper strap, attaching terminals to cable, brazing coil ends, and general coppersmithing



Westinghouse 5 Kva Portable Brazier

work, a portable 5 kva brazier weighing only 30 lb. is announced by the Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pennsylvania.

The brazier, which requires connection to a 220-volt source, consists of transformer, voltage selectors, controls, and carbon-tipped tongs. Alternating current from an adjustable voltage transformer passes through the tongs and parts to be brazed, raising the temperature to a point at which the brazing alloy melts. The brazing alloy may be applied in the form of a rod or in ribbon form. Three outlets are provided on the control panel for 8, 6, or 4 volts. Volt-

ENGINEERED

Live Centers



Standard shanks with Morse tapers carried in stock . . . send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER.

SHANK

GREASE SEAL

LARGE THRUST BEARING

LARGE RADIAL BEARING

CUSHION ACTION

GROUND TRUE with BEARINGS—
REPLACEABLE ALLOY STEEL POINT

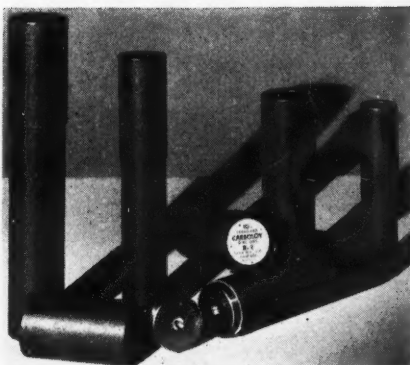
STURDIMATIC

TOOL COMPANY

5222 THIRD AVE. • DETROIT, 2 MICH.

ages are easily and quickly adjusted by inserting bayonet plugs attached to the brazing leads into plainly marked receptacles. A foot switch with pilot cable provides primary control switch.

For use with air-cooled tongs, the Westinghouse 5 Kva Portable Brazier is supplied with a handle for carrying. The unit is cooled by natural air circulation, the air entering at the bottom of the case and being expelled through louvered openings in the top.



Carboloy Packaged Wire Drawing Dies

Carboloy Packaged Wire Drawing Dies

The Carboloy Co., Inc., 11143 E. 8 Mile Blvd., Detroit 32, Mich., announces that it is now packaging all wire drawing dies from R-1 through R-5 in quantities of ten in strong cardboard cylinders having a waxed interlining which is said to effectively protect the dies from moisture. A sticker on the lid of each carton carries such pertinent information as nib size, casing size, and hole size of the dies.

According to the manufacturer, packaging dies in these cases in quantities of ten not only shortens the time required

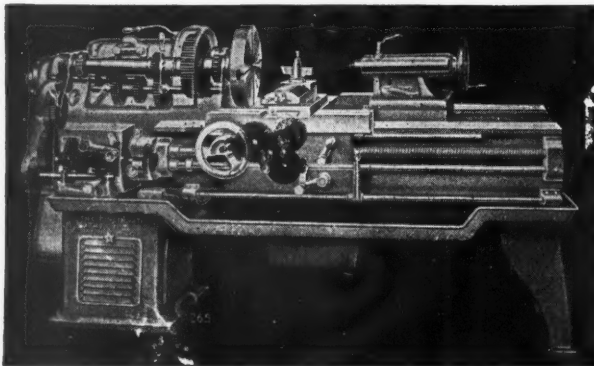
to fill orders for standard dies in the smaller sizes and ensures stock arriving in first class condition, but also adds to the neatness of the user's stockroom and materially speeds up spot inventories. Several sizes of these specially designed cartons are available to accommodate the various standard wire drawing dies.

CINCINNATI

QUICK-CHANGE
GEARED-HEAD
MOTOR-DRIVEN

LATHES

Swings: 14", 16", 18", 20", 22" and 24" — Center Distances 30" and up.



Twelve changes of spindle speeds and thirty-two changes of feed and thread provide adequately for every normal shop requirement.

Thread range 2 to 28 per inch, feeds .008" to .120" per revolution. Other ranges available on demand.

The usual accessories are included in the standard equipment; others supplied on special order.

Your inquiries will receive prompt attention. Our prices and deliveries will be interesting.

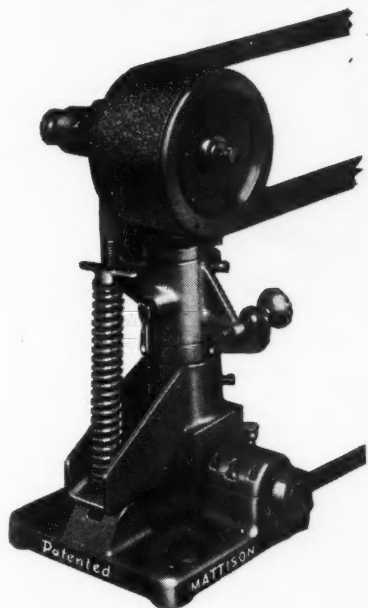
**BUILDERS OF GOOD
LATHES SINCE 1906**

CINCINNATI LATHE & TOOL CO.

MARBURG AVENUE,
OAKLEY, CINCINNATI, OHIO

Mattison

ABRASIVE - BELT BACKSTAND IDLER

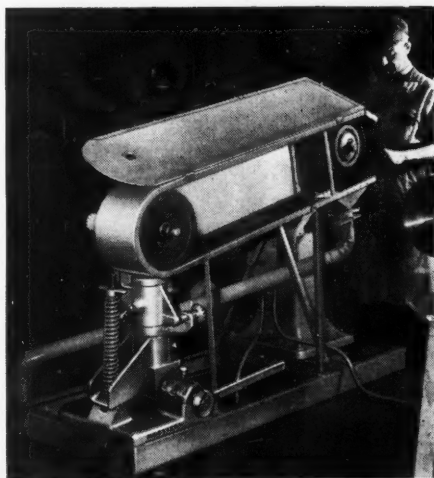


Converts
THE REGULAR GRINDING
AND POLISHING LATHE

To
THE USE OF
FACTORY-COATED
ABRASIVE BELTS



Many manufacturers have definitely determined the greater efficiency and economy of using abrasive belts over set up wheels. There are fewer rejections due to mild scratches, uniform results, less chance of burning or discoloring, lower polishing cost per piece, as a result of increased production. THE MATTISON ABRASIVE BELT BACKSTAND IDLER enables you to take advantage of this method at a very small investment. You use your present lathe and set the Backstand Idler in the rear. For complete information send for our new free circular giving complete details.



MATTISON

MACHINE WORKS

ROCKFORD - ILLINOIS

Hydromat Drill Head

An air-hydraulic drill head that can be used not only for drilling but for milling, tapping, boring, reaming, and turning, to be known as the Hydromat, is now being manufactured by Pacific Aviation, Inc., 9900 Lincoln Blvd., Los Angeles 45, Calif. If desired, the unit can be mounted in multiple setups for performing several operations simultaneously.

Adaptable for drilling holes from No. 80 up to 3 inches in diameter and for bores up to 6 inches in diameter, the Hydromat Drill Head features an infinitely variable air-hydraulic feed and



Hydromat Drill Head

air valving which permits deep hole step drilling to be easily accomplished. According to the manufacturer, the drill head can be mounted at any position or angle on special purpose high production machine tools, sensitive drill presses, power operated floor and radial drill presses, high speed tapping machines, boring machines and turning machines.

SEE BETTER • WORK BETTER



**CARL
ZEISS
INC.
HEADBAND
MAGNIFIER
2 1/4 x**

Use of both eyes reveals true depth of details. Magnification of 2 1/4 x. Free working distance, about 8", permitting unhindered use of hands. By just lifting your head, your eyes are free for any other activity. Eyeglasses may be worn while using. Highest optical quality. Eyshade of Tenite—practically unbreakable.

Also **APLANATIC
FOLDING POCKET
MAGNIFIERS** —
6 and 9 power



Write for Leaflet

CARL ZEISS, INC.

Dept. H-51-7, 485 5th Ave., New York 17, N. Y.

Adjustable Compensator for P&W Model B2 Air-O-Limit Comparator

To obtain higher magnification for the P&W Model B2 Air-O-Limit Comparator, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., has designed an adjustable compensator which can be readily attached to the

SAVE THOSE OLD TAPS. REGRIND THEM

even bench lathes. Taps sharpened after center is destroyed. No collets. Complete. No extras. Write!

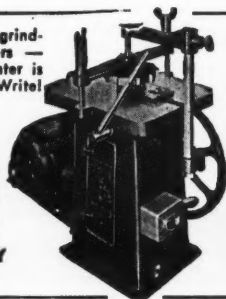


RESHARPEN
DULL TAPS.
PROMPT
DELIVERY.

BROACH KEYSEATER

The Reading Bench Machine does not require bushings or guides. Very fast capacity from 1/8 to 1/2 cutter. Low first cost.

**READING MACHINE COMPANY
READING (CINCINNATI), OHIO**



**WE MAKE PUNCHES AND DIES OF
Every Size FOR EVERY NEED**



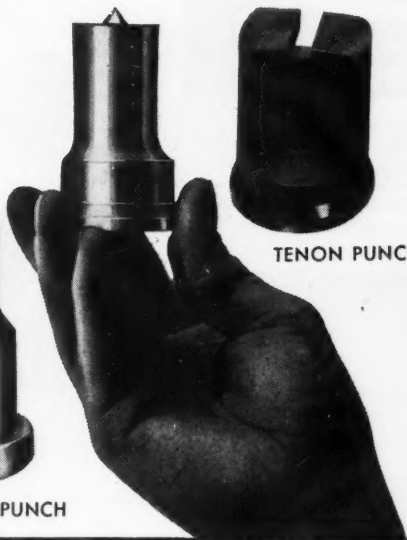
STRAIGHT SHANK



TAPER SHANK



SCREW PUNCH



TENON PUNCH



RIPPING PUNCH

LATTICE
BAR PUNCH

Figure how much you spend each year for Small Tools and then consider how much you could have saved by using Cleveland Quality products.

It's not how much you pay for Small Tools that determines their ultimate cost, it's the service they render.

Write for a copy of our Small Tool Hand Book.

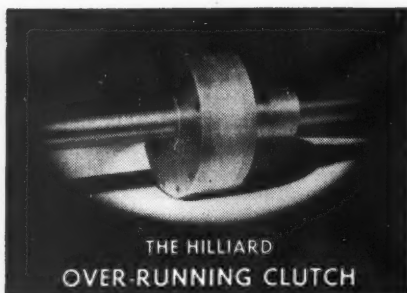
WE MAKE PUNCHES AND DIES FOR ALL THE SHAPES SHOWN



THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

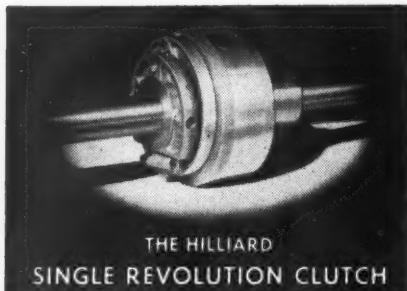
EAST 40th & ST. CLAIR AVE.

CLEVELAND 14, OHIO



THE HILLIARD
OVER-RUNNING CLUTCH

A "Free Wheeling" Clutch of simple design recognized for many years as "Standard Equipment" for Automatic Dual Drive operation—Automatic operation of 2 Speed drive—As a ratchet permitting infinite adjustment and as an automatic backstop. Furnished in a number of types.



THE HILLIARD
SINGLE REVOLUTION CLUTCH

Wherever extremely accurate control of intermittent machine operation is essential the Hilliard Single Revolution Clutch is unequalled. Its accuracy has won for it the acceptance of Industry for cutting, punching and packaging operations.



★ **WRITE TO-DAY!**

For the new series of 6 illustrated Bulletins furnished FREE upon request. Featuring our complete line of Industrial Clutches and Couplings—Over-Running—Single Revolution—Friction—Centrifugal—Over-load Release—Slip

THE HILLIARD CORPORATION

117 W. 4th St.

ELMIRA, N. Y.

Manufacturers of
INDUSTRIAL CLUTCHES

comparator. The adjustable compensator allows full scale graduations of 0.0004, 0.0006, 0.0008, and 0.001 inch to replace the full scales of 0.002, 0.003, and 0.004 inch that are normally used.

In addition to the use of higher magnification, the adjustable compensator offers the further advantages of greater



P&W Air-O-Limit Comparator with Adjustable Compensator

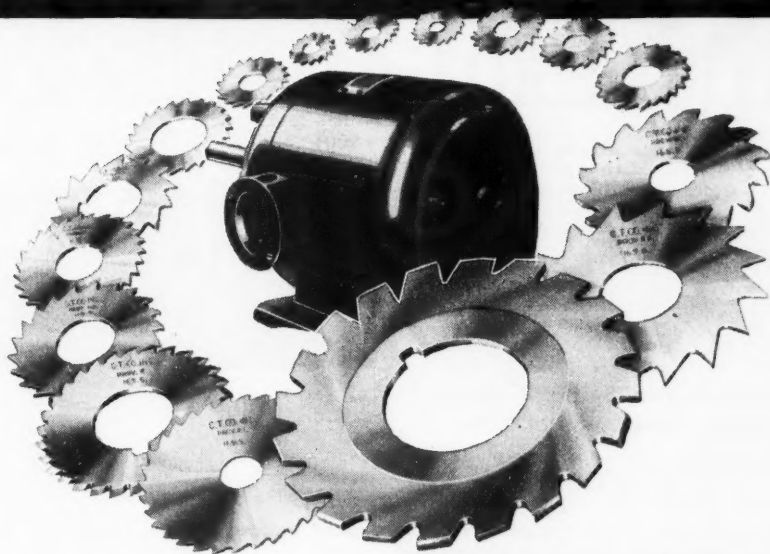
diametral clearance, better side compensation, longer wear life, and greater speed at the higher magnification. A special series of gaging plugs is required since the gaging plugs regularly used with the comparator are not satisfactory for the adjustable compensator.

Carboloy Style T-15 Threading Tools

A series of carbide-tipped threading tools, designated as the Style T-15, has been added to the standard line of tools offered by the Carboloy Co., Inc., 11143 E. 8 Mile St., Detroit 32, Mich. The tools are of the 60-degree V-nose type. Tips are of Carboloy Grade 78-B, a tough and wear-resistant grade of carbide particularly suitable for the long-run threading of steel parts.

The Carboloy Style T-15 Threading Tools are available in square shank sizes of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ inch. The shank lengths range from $2\frac{1}{2}$ to $4\frac{1}{2}$ inches.

A SELECT CIRCLE



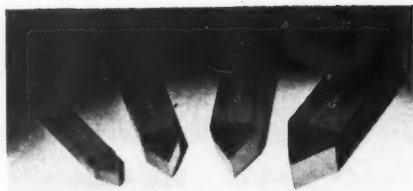
For **CIRCLE R** Commutator Slotting,
Mica Undercutting and Copper Slitting Saws!

Available in sizes ranging from $\frac{1}{4}$ " to $1\frac{3}{4}$ " in diameter, Circle **R** Slotting, Mica Undercutting and Copper Slitting Saws are ground with clearance to **ELIMINATE BINDING**.

Based on proved superior performance, Motor Manufacturers **SELECT CIRCLE R SAWS** to help them build better electric motors for automotive, air and marine use . . . and they **SELECT** them from America's largest manufacturer of these types of saws, the Circular Tool Company.

CIRCULAR TOOL CO., INC.
PROVIDENCE 5, RHODE ISLAND

Chicago, Philadelphia, New York, Dayton, Cleveland, Los Angeles,
Rochester, Indianapolis, Detroit, St. Louis, Minneapolis



Carboley Style T-15 Threading Tools

Primary clearance at the nose of each tool is 3 degrees, with a secondary clearance of 6 degrees provided. This design is said to provide for free cutting while ensuring ample support for the nose of the tool tip.

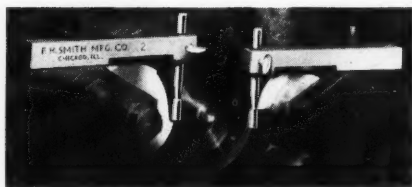
The two smaller sizes of threading tools are packaged in standard lots of 12 each and the two larger sizes in packages of 6 tools each.

Smith Form Tool Setting Gage and Adjustable Length Gage

The development of a form tool setting gage and an adjustable length gage designed to save time in screw machine

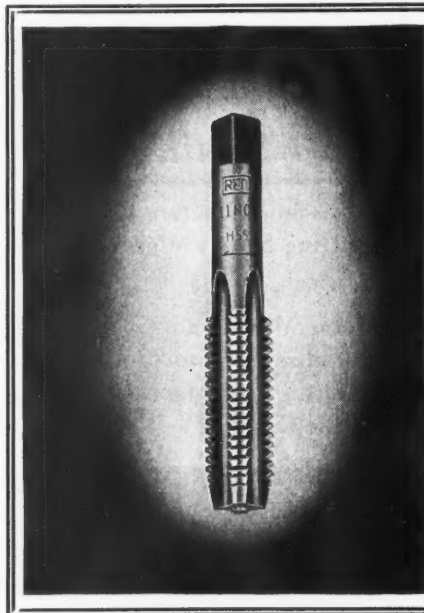
and other shops where quick, accurate gaging is necessary to maintain tolerances with the least interruption is announced by the F. H. Smith Manufacturing Co., 3037 Carroll Ave., Chicago 12, Ill. The form tool setting gage is intended primarily for use on Brown & Sharpe automatic screw machines for resetting the cutting edges of form tools in precisely the same position from which they were removed before sharpening. The gage can be used on other screw machines and lathes.

With the Smith Form Tool Setting



Smith Form Tool Setting Gages

Gage, both front and back slides can be set with equal speed and accuracy with the spindle running in either direc-



R & N TAPS

The Quality which gives R&N Taps that extra dependability, extra ruggedness and extra long life, has long been recognized by critical users. Fine steels—skilled mechanics. Safeguarded by 41 checks and inspections, positively insures Start to Finish Quality Taps.



Send for Reiff & Nestor Catalogue and Tapping Guide. A request on your Letter Head brings it.

REIFF & NESTOR COMPANY
...Manufacturers...

LYKENS

PENNSYLVANIA

UNION SELF-CENTERING SCROLL CHUCK, QUALITY CONTROLLED FOR BETTER SERVICE...



The operation of our own foundry is only one of the controls which enables us to give you better chucks... when you want them. For instance... three types of metal are used in the major parts of the self-centering Geared Scroll Chuck shown above. The jaws are of a special analysis steel to withstand shock and wear. The pinions are made of chrome nickel steel, heat treated and ground. The scrolls are of special alloy steel forgings, heat treated for toughness. Our quality control insures the right steel for every part in this chuck and all others in the "broadest line of chucks in the world". If you have a chucking problem, our complete engineering service or catalogs will help you. Why not write?

BUY UNION CHUCKS FROM YOUR DISTRIBUTOR

UNION MANUFACTURING COMPANY
306 Church St. New Britain, Conn., U. S. A.

**UNION
CHUCKS**

**Low Cost
METAL CUTTING**

VICTOR HIGH
VICTOR UNBREAKABLE SPECIAL

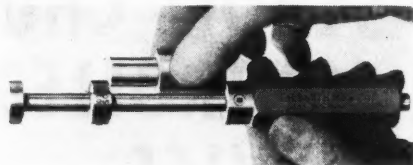
And for fast cutting—free from the disadvantages of tooth stripping and dulling—you can't beat the Victor High Speed Steel "Moly" Type Hack Saw Blade for a smooth, clean finish.
For cutting pipe, tubing, cable, and sheet metal on maintenance jobs—especially where working space is limited and the material tough—expert mechanics have long preferred Victor Unbreakable Special Flexible Hack Saw Blade.

VICTOR
SAW WORKS, INC.
Middletown, N. Y.

Makes a lot of hand and power hack saw blades, frames and metal cutting band saw blades.

tion. The gage is made in three sizes for Nos. 0, 00, and 2 machines.

The adjustable length gage is designed for the quick checking of length dimen-

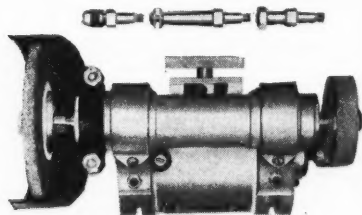


Smith Adjustable Length Gage

sions. Tolerances of 0.005 and 0.010 inch are ground in either end of the adjustable limit ring as marked, while the fixed end and adjustable handle are ground flat. The adjustable length gage is available with the adjustable limit ring or with one or more limit rings, providing several combinations of tolerances in multiples of 0.005 up to 0.020 inch, thus increasing the adaptability of the gage.

Themac Type J-45 Grinder

Designed for grinding holes from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter to a depth of $\frac{3}{4}$ inch and holes from $\frac{5}{8}$ to $2\frac{1}{2}$ inches to a depth of 2 inches, a $\frac{1}{2}$ h.p. universal grinder designated as the Themac Type J-45 is now being marketed by The McGonegal Manufacturing Co., East Rutherford, N. J. Five interchangeable pul-



Themac Type J-45 Grinder

leys allow for operation of the grinder at speeds of 4,200, 6,300, 9,300, 26,000, 31,000, and 42,000 revolutions per minute.

Constructed for operation on 25-60 cycle a.c. or d.c., the Themac Type J-45 Grinder is supplied complete with four belts; two $1\frac{1}{2}$ and two 2-inch diameter wheel collars; wheel guard; $1\frac{1}{4}$ x $2\frac{3}{4}$ x $\frac{3}{8}$ -inch clamp nut; can of oil; clamp head

WHAT DO YOU
LOOK FOR IN
**DRAWING
COMPOUNDS**

Is it longer die life, better finish or fewer rejects?

Fiske Compounds, offer you these and more. Easy mixing, freedom from odor, and rust prevention are also characteristic. A Fiske Compound will be recommended after consideration of all your requirements. Fiske Compounds are sold on a "result" basis. Write today for information and literature.

FISKE
Metal Working
LUBRICANTS

FISKE BROTHERS REFINING COMPANY
NEWARK 5, N. J. **TOLEDO 3, OHIO**

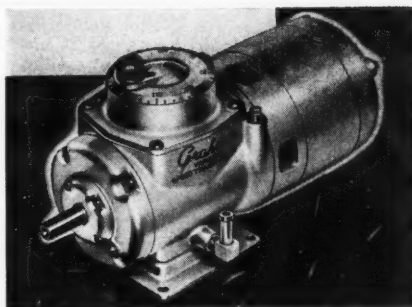
Since 1870

lock pin; four mounted wheels ($\frac{1}{4}$, $\frac{1}{2}$, 1, and $1\frac{1}{2}$ -inch diameter); six straight wheels ($\frac{1}{8}$, $\frac{3}{8}$, 2, 3, 4, and 5-inch diameter); three wrenches; and three interchangeable extension spindles. Special extensions up to 6 inches in length can be supplied as extra equipment for the grinder, which has a net weight of 17 lb. and is furnished packed in a steel carrying case.

Graham Improved Variable Speed Drive

Featuring more compact construction, lighter weight, and other design improvements, the variable speed drive now being marketed by Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis., is available in two sizes; namely, Model 15 for motors up to $\frac{1}{2}$ h. p. and Model 40 for motors from $\frac{1}{4}$ to $\frac{3}{4}$ h. p. The unit may be obtained with or without a built-in motor and with built-in parallel spur or right angle gearing, and in a wide variety of controls.

While the Graham Improved Variable Speed Drive incorporates no major change in the method of construction or operation over previous models, the de-



Graham Improved Variable Speed Drive

sign of many of the components has been changed and die castings are utilized instead of cast iron to provide for more efficient operation.

Maxitorg Automatic Overload Release Clutch

The Carlyle Johnson Machine Co., Manchester, Conn., announces the production of an automatic overload release

BOYÉ & EMMES GEARED HEAD ENGINE LATHES

**Flexibility in use
... with a size
for every purpose
14" to 36"**

**WRITE
FOR
BULLETINS**



FOR plants, large or small, in which precision operations are top priority. Ninety per cent of the railroads in the U.S.A. . . . tool and die shops, automobile plants, electrical equipment plants, colleges, steel mills, arsenals and other shops use these engine lathes.

THE BOYÉ & EMMES MACHINE TOOL CO.
CINCINNATI 13 OHIO

FOR HIGH SPEED OPERATION



TWO *New* STANDARD

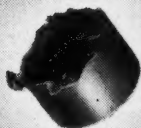
CUT-OFF OR GROOVING TOOLS!

Designed especially to meet the increased production requirements of today.

1. Tungsten carbide tipped—for greatest efficiency at fastest cutting speeds. Recommended for hollow work.
2. Emprite—a newly developed material that brings higher efficiency to that range between high speed and carbide. Particularly recommended for tough jobs that ordinary blades will not take.

These blades incorporate all the outstanding features that characterize the Luers Blades—the T-shaped design that provides for necessary clearances on all sides, and the exclusive hollow-ground top—all of which eliminate excessive friction.

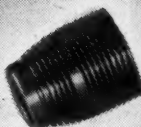
Empire Tool Co. manufactures Luers Patented Cutting-off Blades and Holders under license issued by John Milton Luers Patents, Inc.



The ragged edge shown above was the result of using ordinary blade—the blade was pushing not cutting, and caused the tube to collapse before it could cut.



When Emprite blades were used on the same material a clean cut resulted. Twenty-five times as many cuts were made before re-grinding of blade was necessary.



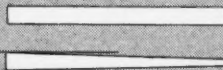
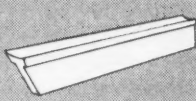
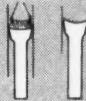
This part was produced most efficiently through the use of 19 Empire Cut-off Blades set in a special gang holder.

EMPIRE

8774 GRINNELL AVE.

TOOL COMPANY

DETROIT 13, MICHIGAN



clutch which can be assembled, adjusted, or taken apart without the use of tools. The automatic overload feature of the clutch, which is known as the Maxitorq, is said to be of particular importance to users requiring instant release of the clutch in the event of overload. By means of a simple, yet delicately made, finger-tip adjustment, the clutch can be made extremely sensitive to any overload condition, the manufacturer states. Disengagement is automatic and instant when overload takes place, and the clutch slips positively into neutral, it is claimed.



Maxitorq Automatic Overload Release Clutch

The Maxitorq Automatic Overload Release Clutch may be used on a continuous shaft or as a cut-off coupling type for connecting two shafts. The axial sleeve pressure varies with the torque to be transmitted up to the maximum of each clutch size. The Maxitorq is available in six standard sizes of $\frac{1}{4}$, $\frac{1}{2}$, 1, $1\frac{1}{4}$, 3, and 5 horsepower.

Lincoln Park Cemented-Carbide Thread and Gear Measuring Wires

Announcement is made of a complete line of thread and gear measuring wires made of Carboloy cemented-carbide by Lincoln Park Industries, 1719 Ferris Ave., Lincoln Park 25, Mich. The measuring wires, it is claimed, are ground and

GEAR GUARDS

Protect your men from serious accidents, and cut the loss of valuable work hours—cover gears, chains, belts, wheels, with a Littleford fabricated guard. Made to specification to fit any machine large or small—send blueprints to Littleford.



LITTLEFORD
LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, O.

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

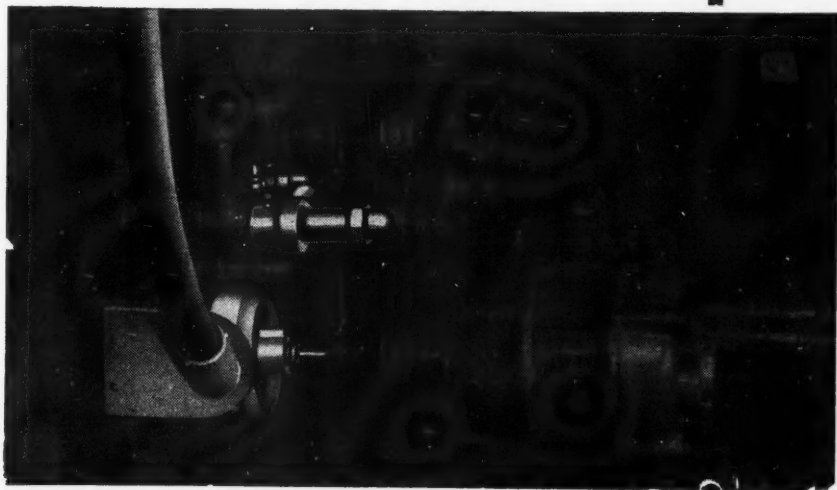
ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

KEEP 'EM COOL...IMPROVE PRODUCTION



COOLANT PUMPS

SO much depends on the efficient delivery of coolants to the parts you're working on that only the **BEST** will do . . . and that's **FULFLO**.

Proved by every test in the nation's most exacting industrial plants . . . installed on machines which are set to produce the finest and most precision-gaged parts . . . most economical and dependable. And every claim proved!

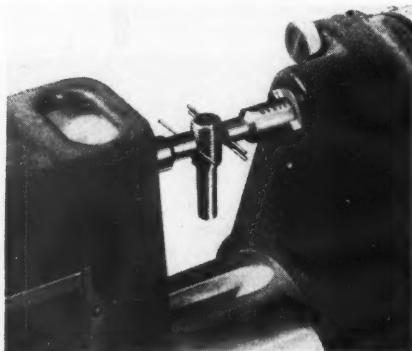
Easily installed or built in. Standard and special models. Pipe sizes from $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

*Write today on your letterhead for
FULFLO MECHANICAL DATA BOOK
on Coolant Pumps & By-Pass Valves*



Specialties Co., Inc.
BLANCHESTER, OHIO

lapped to standard tolerances closer than National Bureau of Standards specifications. Through the use of cemented-car-



Lincoln Park Cemented-Carbide Thread and Gear Measuring Wires in Use

bide, accuracy is said to be retained over a long period of use and the possibility of "flats" developing, with resultant inaccurate readings, eliminated.

The wires are supplied in sets of three

contained in glass bottles labeled to show the size of the wires and the wire-constant corresponding to the number of threads per inch. Wires for N. S. 4 to 36 pitch are available from stock. Wires for other pitches, Whitworth, British Association, metric, Acme, worm threads and gear wires are supplied on order.

General Model MCF 5-Position Cam-Lever Switch

Designed especially for ease in assembly and wiring, a 5-position cam-lever switch designated as the Model MCF is announced by the General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass. The construction of the unit allows for the single hole mounting of the switch frame to the panel and single bolt assembly of the contact block to the switch frame. The single bolt assembly permits soldering of the wiring to the contacts to be performed where it is most convenient—away from other units or even at a bench, if desired.

The Model MCF is locking or non-locking in all positions except the center position, where it is always in a locking posi-

SAVAGE NIBBLING MACHINE FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

It's rugged construction and ease of operation make it worth investigating.

Cutting Capacities:

Flat mild sheets $\frac{3}{4}$ "
Tough alloys $\frac{5}{8}$ "

MODEL
No. 218

Tubing:

Wall thickness to $\frac{3}{8}$ "
1" I.D. to 36" O.D.

Tube cutting
attachment

ASK FOR BULLETIN "H"

Manufactured By

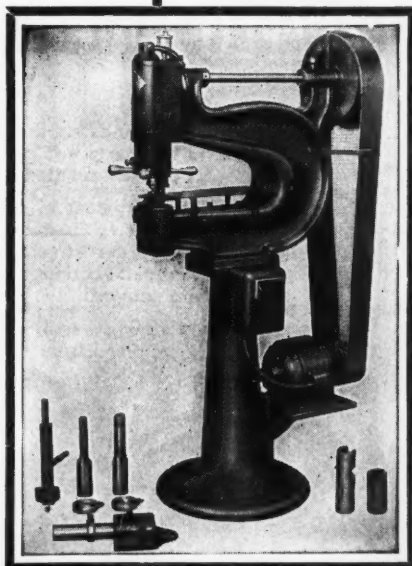
W. J. SAVAGE COMPANY

Since 1885

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a MACHINIST is only as good as his TOOLS

In tool-room, shop or on the production line, output per worker depends largely upon the tools at hand. That's why keen management depends on Williams for Tool Holders, Lathe Dogs, "C" and Strap Clamps—those "personal" tools that are the everyday team-mates of highly-paid mechanics.

J. H. WILLIAMS & CO.,

Williams Machinists' Tools are all drop-forged and produced with exacting skill to high standards of design and workmanship. Write for a copy of Booklet describing these fully guaranteed tools today. Williams Machinists'

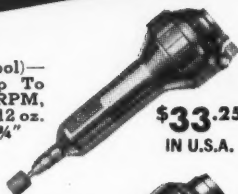
Tools are sold by leading Industrial Distributors everywhere.

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3 NEW *Featherweight* **KIPP AIR GRINDERS**

MODEL JA

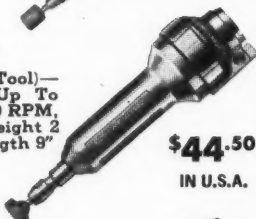
(Turbine Type Tool)—
Takes Wheels Up To
 $\frac{7}{8}$ " Speed 50000 RPM,
Collet $\frac{1}{8}$ ", Weight 12 oz.
Overall Length 6 $\frac{1}{2}$ "



\$33.25
IN U.S.A.

MODEL TT

(Turbine Type Tool)—
Takes Wheels Up To
 $\frac{1}{4}$ " Speed 30000 RPM,
Collet $\frac{15}{64}$ ", Weight 2
lbs., Overall Length 9"



\$44.50
IN U.S.A.

MODEL PVT

(Vane Type Tool) — A
Power Tool For The
Heavier Jobs Taking
Wheels Up To $2\frac{1}{2}$ ",
Speed 10000 RPM, Collet
 $15/64$ ", Weight 2 lbs. 4
oz., Overall Length 9"



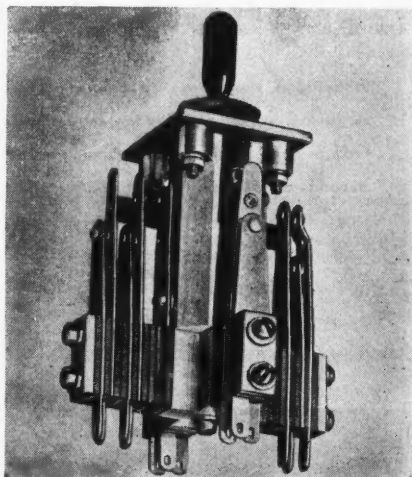
\$55.50
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Order Now!

You now have your choice of three
Featherweight Kipp Air Grinders as
illustrated above. All three are avail-
able for immediate delivery and
priced extremely low. Madison-Kipp
carries a full line of Kipp grinder
wheels and accessories. Order today.

**MADISON-KIPP
CORPORATION**
208 Waubesa St., Madison 4, Wis.

tion. The motion of the switch from the center to all switching positions is in a straight line switch, together with the positive roller action, results in maximum



General Model MCF 5-Position Cam-Lever Switch

ease of operation. The fine silver contacts are permanently riveted to nickel-plated, phosphor-bronze contact springs, and all parts are non-corrosive. The contacts are rated at 10 amperes, 125 volts, a. c. (non-inductive load).

UPPCO Standard Gage Sets

The availability of complete standard gage sets housed in durable cabinets is announced by the United Precision Products Co., 3524 W. Belmont Ave., Chicago 18, Ill. Cabinet No. 500 contains 471 gaging members ranging in size from 0.030 to 0.500 inch in increments of 0.001 inch (each member having its own plastic collet); seven lightweight handles; and four drifts to fit all size ranges. Gaging members are progressively stored in the three-drawer cabinets, each in its own receptacle. The size of gage is stamped on each collet for instant pick-up.

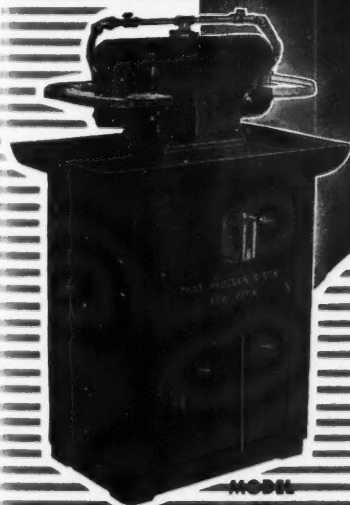
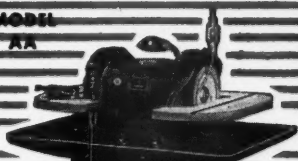
Cabinet No. 600 contains 501 gaging members in four drawers, the members ranging in size from 0.500 to 1.000 inch in increments of 0.001 inch. Plastic collets are included for each pin. In addition,

PROSSER

Carbide Grinders



MODEL
AA



MODEL
EE

For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

Important features include:

- Quick-acting indexing tables.
- Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- Moderate price.
- Prompt deliveries.

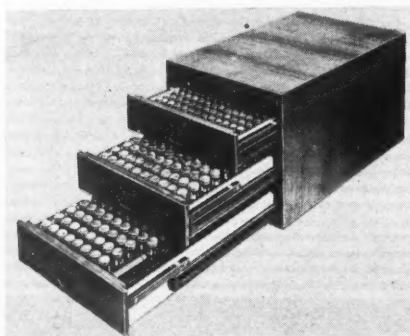
Write for details

Thomas Prosser & Son

120 WALL STREET • NEW YORK 5, N. Y.

the cabinet contains four lightweight handles and four drifts to fit all size ranges.

Both the Cabinet No. 500 and Cabinet No. 600 have an attractive walnut finish



UPPCO-AA No. 500 Standard Gage Set

and are designed with double-suspension ball bearing-equipped sliding drawers with tumbler locks. The No. 500 measures $16 \times 25\frac{1}{4} \times 12\frac{3}{4}$ inches in size, while

the No. 600 measures $21\frac{1}{8} \times 27\frac{1}{8} \times 20$ inches in size. Gaging members are available in XX, X, Y, Z, and ZZ tolerances, UPPCO-lapped or chrome-plated UPPCO-lapped. Corrosion-proof and insulating, the plastic collets are light and durably made and are said to ensure firm locking.

Salsbury Power Package

A low horsepower, completely automatic driving unit in which drive ratios are controlled by the driven unit and clutch engagement is controlled by engine speed, to be known as the Salsbury Power Package, is announced by Salsbury Motors Inc., 4464 District Blvd., Los Angeles 11, Calif. The transmission consists of a variable diameter drive pulley, a variable diameter driven pulley, and a V-belt. These units form a coordinated assembly which provides automatic, infinitely variable ratios over a 4-to-1 range.

Drive ratio is controlled as a function of driven shaft speed. Normal overall reductions may range from 4 to 1 to 1 for light duty high speed units and from 200 to 1 to 50 to 1 for heavy duty, low



WORK IN PROCESS IS ALWAYS ON THE MOVE

It's raised and lowered, shifted and placed; transported about the shop. Tools and dies move too; and assemblies and stock! • Many of these moves require the strength of two or more men, resulting in idle periods on the "helpers" machine and risk of strain and injury to all involved. • Solve this problem with PORTELVATOR, the Hamilton Portable Elevating Table! Raises and lowers, transports and height adjusts. Heavy tools and materials are ROLLED from place to place, raised or lowered to desired position and SLID from Portellevator to work surface. Saves time, strain and effort. Enhances profits. • Made in three standard models to lift and carry 1,000 to 5,000 pounds. Special models designed for "out-size" requirements. Write for literature and prices . . . Address Department B-P.



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Positive
INCREASES
Gearshift

• CAPACITIES • ½ to 20 hp •

*Engineered for Precision Operation of all types
of Machine Tools requiring Selective Speeds*



THE LIMA ELECTRIC MOTOR CO.

136 FINDLAY ROAD

LIMA, OHIO

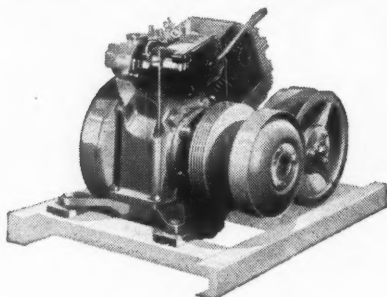
REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES

LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS



speed requirements. Automatic change of ratio within these limits may be effected to suit the needs of the individual



Salsbury Power Package

user. The transmission may be originally assembled to limit the engine speed automatically to any desired value under normal operating conditions. The V-belt used for the drive is claimed to have a normal life of 1,000 to 3,000 hours, depending upon the care and type of service in which it is used.

Built into the drive pulley of the Sals-

bury Power Package is an automatic, centrifugally-operated, opposed-shoe type clutch which is said to provide for velvet-smooth engagement and disengagement with acceleration or deceleration of the engine. The engine is a single-cylinder four-cycle air-cooled type developing 6.5 h.p. at 3,200 r.p.m. or 1/3 h.p. per cubic inch of displacement. It occupies but 1 1/2 cubic feet and weighs 56 lb. Pressure lubricated, the engine features a horizontal carburetor with a short, straight intake manifold mounted on an inclined cylinder.

According to the manufacturer, the Salsbury Power Package possesses unusual advantages where, in the power range, high starting torques or momentary underloading or overloading occur, and is adaptable to a wide variety of needs in the stationary, portable, or vehicular fields.

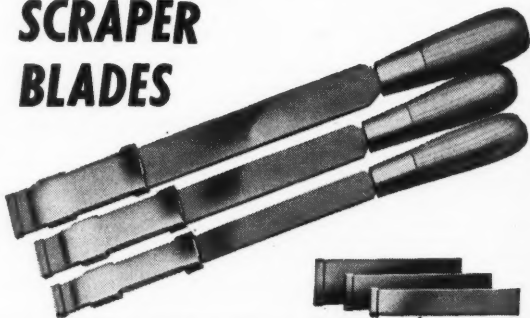
Lisbon Bob Cat Model Electric Cable Hoist

The Lisbon Hoist & Crane Co., Lisbon, Ohio, is now introducing an electric cable hoist, designated as the Bob Cat

Anderson

Speed up scraping operations with these efficient blades. They are especially good for hard alloy iron and the extremely hard bronze castings. If you are already using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove the high-speed steel blade and slip in the Anderson Carboloy Tipped Blade. They are available in three widths.

CARBOLOY TIPPED SCRAPER BLADES



THEY LAST 8 TO 10 TIMES LONGER

ANDERSON BROS. MFG. CO.

Anderson

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Show them how to grind it with **3M ABRASIVE BELTS**



● No grinding job is "too tough" when you use 3M Abrasive Belts over a 3M Segment Face Contact Wheel. On curved or flat parts, this smooth working combination enables you to turn out smoother finishes in less time, at lower cost. Prove that, in your own department, by asking your 3M Distributor for a demonstration.

MINNESOTA MINING & MFG. CO.

THE 3M COMPANY

SAINT PAUL 6, MINNESOTA

MMS746

Please send us a copy of your booklet "Step Up Production with 3M Method of Grinding and Finishing".

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1946

July, 1946

MODERN MACHINE SHOP 281



It's all the same to a Vac-It—sludge, metal chips, lubricant, coolant—even bolts, nuts or rivets. All are recovered with equal facility by the Hercules among industrial vacuum cleaners. And efficient clean-up methods mean savings in man-hours and machine-hours to you — as well as assuring a smoothly run production operation.

So write today for complete information about the Doyle Vac-It. Doyle has the equipment and experience to handle your most perplexing cleaning problem.



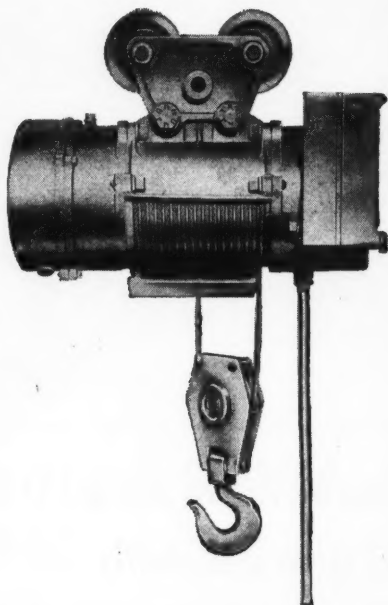
Doyle VAC-IT

DOYLE VACUUM CLEANER CO.

3225 Stevens St., S.W. Grand Rapids 7, Mich.

Model, which is unusually light in weight, thus making it convenient to erect or remove where desired.

The hoist consists essentially of three sections, thereby permitting complete and easy access to any part by the removal of approximately four bolts. Made entirely of steel forgings and castings, it is said to have a safety factor of 6 to 1 or better. The motor is entirely enclosed



Lisbon Bob Cat Model Electric Cable Hoist

in a drum with patented heat dissipation construction and connection. The hoist is ball bearing equipped and is provided with heat-treated alloy steel gears.

Optimus Continuous Type Metal Washing Machine

The Optimus Equipment Co., 161 Church St., Matawan, N. J., is now introducing a continuous type washing machine for handling large numbers of metal parts on racks prior to plating, painting, or similar processing. The machine, it is claimed, can be used with any type of parts that are free draining.

The Right BUR for the Job

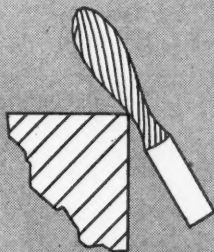
BLEND STRAIGHT, CONCAVE
OR CONVEX SURFACES WITH

Shape "S"

FLAME

Blending irregular surfaces on castings often calls for a bur which can handle concave and convex as well as straight surfaces. Shape "S" KELLER Bur is "Bi-shaped," with a combination of concave and convex radii for easier, more versatile operations on difficult surfaces. Another use is for removing stock from sharp corners. Pratt & Whitney KELLER Burs are ground from the solid, *by machine*, to give dependable, smooth-running service and long life. Write for full information on the complete line.

Shape "S" is available in $\frac{1}{8}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ " diameters, to permit working in very small areas. Surface is fine, medium, or coarse cut.



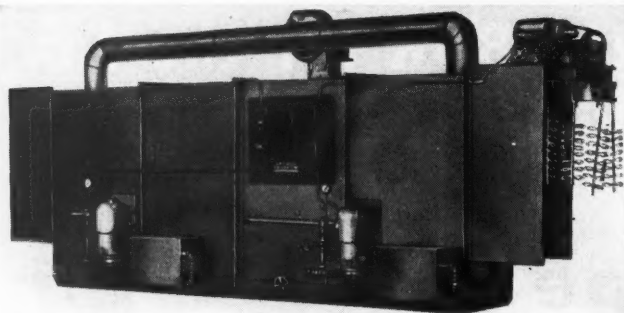
Concave radius removes stock from a sharp corner.



The convex grinding radius blends this irregular contour easily, swiftly.



PRATT & WHITNEY
Division NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DEPARTMENT
WEST HARTFORD 1, CONN.



**Optimus Continuous
Type Metal Washing
Machine**

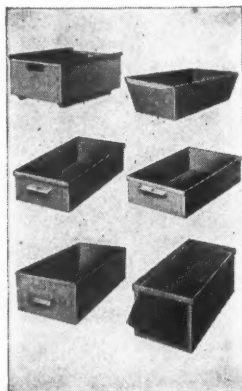
The unit can be utilized as a single stage washer, or it can be arranged to subject parts to a number of successive cleaning operations—alkaline, acid, or neutral. With slight alterations, the machine can be used in performing a series of different operations, such as washing, rinsing, drying, pickling, cyanide treating, and so on. If an acid solution is used, the machine is furnished built of acidproof material.

The principal use for the Optimus Continuous-Type Metal Washing Machine is for removing buffing compositions

number of manifolds with spraying nozzles are mounted on all sides of the washing chamber. The solution circulating system includes a pump, piping, series of filters and strainers for filtering the solution before it is handled by the pump, and all necessary heating devices and accessories. The conveyor is an overhead chain type winding around two end sprockets driven by a motor and speed reducer with variable speed pulley.

The Optimus Continuous Type Metal Washing Machine is supplied ready to use and may include an electric panel

from metal parts prior to plating. The machine functions completely closed and may be connected to an exhaust blower so that fumes, unpleasant odors, or excessive heat is eliminated. It can be heated by steam, gas, or electricity. A



Top Rim STEEL STACKING BOXES

**18" x 12" x 6". 16 Ga.
with Drop Handles—\$1.27 each**

STANDARD SIZES

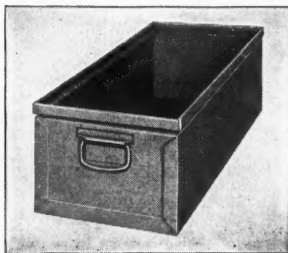
16 x 10 x 6 18 Ga.

16 x 10 x 6 16 Ga.

18 x 12 x 6 16 Ga.

18 x 12 x 8 16 Ga.

MADE IN OTHER SIZES



WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

STERLING
FACTORY EQUIPMENT CO

**183 CHARLES ST.
PROVIDENCE, R. I.**

CUT THE COST OF *Machines to One* WORK REST BLADES

TUNGSTEN CARBIDE-TIPPED

NEW
S-E-G-M-E-N-T
TYPE*

NEW SCULLY-JONES Segment-Type* WORK REST BLADES will save you money because (1) a damaged blade is no longer a lost blade, and (2) only the individual damaged segment needs to be replaced.

New Segment SLOTS (an exclusive feature) are self-clearing and so designed that metal chips and grit are quickly carried away by the circulation of the coolant. Thus, with slots constantly free of accumulation, chips do not collect to mar the work being ground.

This Segment-Type* Design makes it possible to use a harder, longer-wearing grade of carbide.

The cost of Scully-Jones re-conditioning service on this Segment-Type* Blade is but a fraction of the cost of a new blade.

Write for prices and delivery on this long-wearing improved type of Work Rest Blade for Centerless Grinders.

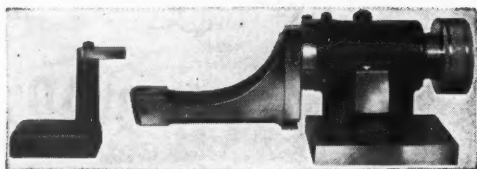
Refer to the Scully-Jones Catalog showing over 500 types and sizes of cutting tools, collets, chucks, boring equipment, centers, etc.

Scully-JONES
AND COMPANY

1913 SOUTH ROCKWELL STREET - CHICAGO 8, U. S. A.

1796 688

SCULLY-JONES SEGMENT-TYPE*
T.C.T. WORK REST BLADES



"Jo-Set" Radius Dresser

with all necessary switches and an exhaust blower. Side insulation may be provided for the comfort of operators. Thermostatic control is available for any type of heating.

this setup within 1 or 2 minutes. A hardened and ground master gage is provided to maintain the center of axis for the life of the tool, thus eliminating the need for indicators, micrometers, feelers, and so on. The holder is designed with an independent adjustment for correcting any error in diamond sharpness. Through this adjustment, wheel particles are thrown away from the dresser and operator, and wheel vibration is said to be lessened. Unusual accuracy is claimed for the Jo-Set inasmuch as it dresses the wheel where it grinds. This advantage also permits dressing while the wheel guard is in place.

"Jo-Set" Radius Dresser

Designed to provide for gage block accuracy, a precision wheel dresser to be known as the "Jo-Set" is now being marketed by the James H. Cross Co., 2765 W. 8th St., Erie, Pa. According to the manufacturer, only three simple steps are required to set up the dresser for precision operation; namely, (1) set point of diamond to movable gage, (2) set radius by inserting gage block between stop and jib, and (3) set stops. The manufacturer claims that an apprentice can perform

Lipe Multiple Spindle Pneumatic Bar Feed

Said to solve all stock feeding problems, a pneumatic bar feed for multiple spindle automatics is now being offered by the Lipe-Rollway Corp., Syracuse 1, N. Y. With the equipment, stock bar can

All point to 262 C

INSTANT ARC

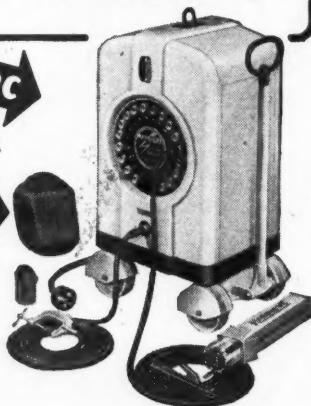
NO MAGNETIC BLOW

HIGH POWER FACTOR

TELNIC BRONZE PLUGS AND SOCKETS

TRUCK MOUNTED

20-275 AMPS.



• Marquette's outstanding new transformer design gives you INSTANT ARC Striking without extra high frequency or booster gadgets. Model 262 C has a High Power Factor of 95%. Telnic Bronze plugs and sockets double current carrying capacity. Its wide range of 20 to 275 amperes takes all machine shop welding jobs in stride from light jigs, fixtures and gauges to hardsurfacing tools, dies, punches, cutters, etc. Models: 262 C and 262, 20-275 amps.; 261 C and 261, 20-200 amps. Write today for literature on these superb Marquette Welders.

MARQUETTE MFG. CO., Inc.
Minneapolis 14, Minnesota

MARQUETTE
REGISTERED U.S. PAT. OFFICE
A.C. ARC WELDERS



*Marquette Welding Equipment
Sold Exclusively thru the
Nation's Leading Distributors*

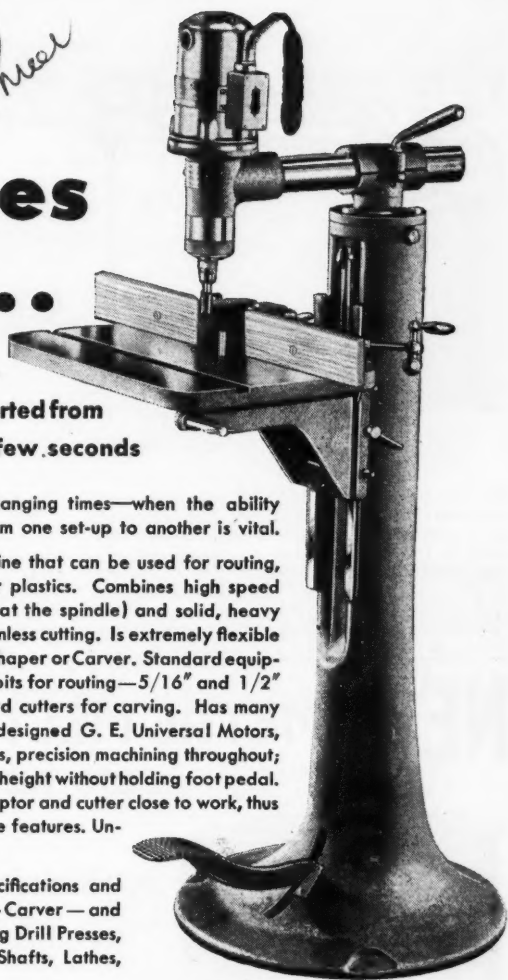
three **machines** **in one...**

This low-cost DURO Router-Shaper-Carver can be converted from one use to another in a few seconds

An ideal machine for these quick-changing times—when the ability to shift rapidly and economically from one set-up to another is vital.

Here is an unusually flexible machine that can be used for routing, shaping and carving wood, metal or plastics. Combines high speed (20,000 R.P.M.) power (1200 watts at the spindle) and solid, heavy construction that gives smooth, vibrationless cutting. Is extremely flexible—can be transformed quickly into a Shaper or Carver. Standard equipment handles 1/4", 5/16" and 3/8" bits for routing—5/16" and 1/2" bore shaper cutters—and all standard cutters for carving. Has many special features including: Specially designed G. E. Universal Motors, New Departure Precision ball bearings, precision machining throughout; Table can be instantly adjusted to any height without holding foot pedal. Chuck is part of spindle and holds adaptor and cutter close to work, thus preventing whip. Many other exclusive features. Unusually low priced.

Send for Catalog—giving full specifications and prices on the DURO Shaper-Router-Carver—and other DURO quality Machines including Drill Presses, Circular Saws, Band Saws, Flexible Shafts, Lathes, Sanders and Electric Drills.

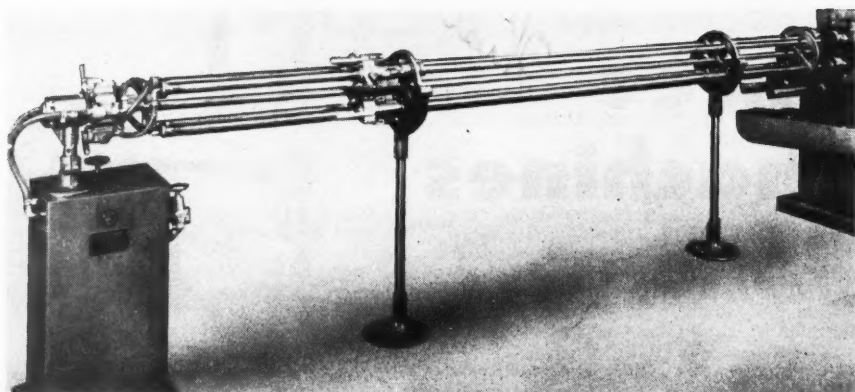


DURO TOOLS

MACHINE TOOL DIVISION

DURO METAL PRODUCTS CO. 2683 N. KILDARE AVE., CHICAGO 39, ILL.

ALSO MAKERS OF DURO HAND TOOLS



Lipe Multiple Spindle Pneumatic Bar Feed

be fed any distance and positively held against the stop. Each bar is supported in a revolving cup center at the rear end and in the collet of the machine—an arrangement which provides for the elimination of scratching or marring of the bar surface. Stock of any shape can be used with the bar feed, which is design-

ed to eliminate "whipping" and noise.

According to the manufacturer, the Lipe Pneumatic Bar Feed is very simple in operation. A cylinder long enough to contain a full length bar is provided for each spindle, carried on the usual stock support reel. A piston in each cylinder is actuated by very low air pres-

NEW METAL MELTING FURNACE

CUTS MELTING

TIME IN HALF

JOHNSON No. 616



Designed to save time and gas, this new Johnson melting furnace offers unusual efficiency and economy in melting such metals as lead, babbitt, tin, zinc, aluminum and type metal. Melts 600 pounds of lead in 29 minutes! Equipped with powerful Johnson direct jet burners, each having independent shut-off control. Permits use of 6 burners to develop pot temperature, 3 burners to hold temperature. No forced air blast required. Heavy insulation retains heat and minimizes operator fatigue. Low in original cost and upkeep. Write for details on the Johnson No. 616.

\$130.00 F.O.B. Factory

JOHNSON GAS APPLIANCE CO.


571 E. AVENUE N. W.

CEDAR RAPIDS, IOWA

288 MODERN MACHINE SHOP

July, 1946

Now **TECO'S** proven superiority
... greater than ever!



MORE pieces between grinds
MORE grinds per tool
LESS down time
LOWER tool cost

Use the **IMPROVED**
TECO Cemented Carbide

TECO Cemented Carbide has been out-producing similar materials—consistently, for many years. It is the No. 1 choice of experienced machinists on all types of carbide work.

Now — we are in production on a greatly improved Teco. New metallurgical techniques and controls have so intensified Teco's characteristics, that the **Improved** Teco Cemented Carbide is more than ever in a class by itself.

Severe tests on tough jobs, show that **Improved** Teco produces far more work, at higher speeds, with less breakage, than ever before.

Just make this convincing test. Replace present carbide tools, on any job, with the **Improved** Teco Cemented Carbide. Check its production — its life — number of grinds — and the job-tooling cost. You will get carbide performance beyond any you have ever known.

Improved
TECO
CEMENTED CARBIDE

Send details of your job set-up, or call one of our tool engineers for a discussion. Write for the latest Teco catalog and price list.

TECHNICAL METAL CORPORATION • 1000 10th Avenue
Hoboken City, New Jersey

Branch Office: 403 Western Reserve Bldg., Cleveland 13, Ohio
Representatives: Indianapolis, Ind. (Chicago, Ill., Detroit, Mich.)

sure which is applied at all times. The instant the collet opens, the bar is fed out to the stop and held firmly until the collet is closed. When a bar is used up and a new bar is required, the operator moves a valve handle which shuts off the air and opens a vacuum circuit which retracts the piston into a chamber that can be swung away, thus permitting the loading of the new bar in the usual manner. With a slight modification of the screw machine, stock can be fed out at any or all stations, thus making it possible to produce long pieces with comparatively narrow form tools.

The multiple Bar Feed is available standard for $\frac{3}{8}$ and $1\frac{1}{4}$ -inch four-spindle Acme-Gridley automatics and as special for most other multiple-spindle machines. It is also available for the Conomatic vertical four-spindle automatic.

Shuttle Feed Accessory for Denison Multipress

A shuttle feed accessory for use on its recently introduced Multipress has been announced by The Denison Engineering Co., Columbus 16, Ohio. Greatly broadening the scope and utility of

the multi-purpose small capacity hydraulic press, the accessory is adaptable for a wide variety of high speed production jobs, including powder pelleting.

The basic press employed may be either a 4 or 6-ton Denison Multipress. When either of these models is equipped as shown, a hydraulic ejection cylinder and a hydraulic cylinder for actuation of a powder feed box are installed. The three hydraulic rams—the press ram, the ejection ram, and the feeding box ram—are all positively interlocked. The sequence of operation is: (1) the shuttle feed moves the filling box from the powder storage hopper over the die and then retracts; (2) the pressure ram descends and forms the pellet; and (3) the ejection ram raises, ejecting the pellet, and maintains the pellet above the die surface until the shuttle feed ram has again moved the filling box over, off-bearing it, and again filled the die.

The Multipress units used in setting up a pelleting machine are also equipped to provide Multipress "vibratory action;" that is, the press ram action can be preadjusted to deliver up to 18 short full pressure loaded strokes in conjunction with each full stroke. The length of these short vibratory strokes is subject to adjustment in the range from $\frac{1}{4}$ to

"DUPLX" Nut Slotter!

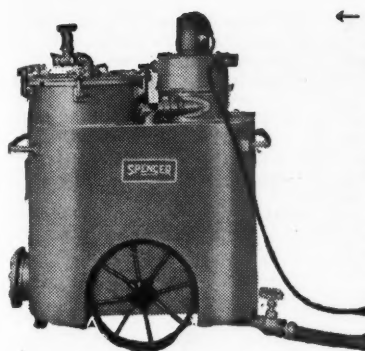
**Adaptable to
Milling of parts
of various shapes
and sizes . . .**

SLOTS 2 SIZES AT ONCE, TWO CONTINUOUSLY OPERATING CONVEYORS. AUTOMATIC BURR REMOVAL...AS HIGH AS 3000 SLOTTED PARTS PER HOUR.



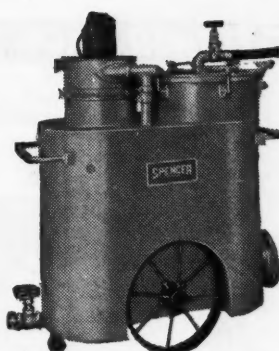
PELLOW MACHINE Co.

13510 FOLEY AVE., DETROIT 27, MICH.



← Pick-up position: Suction hose on intake at swivel connection—Two way valve open—slide valve in—three way valve open to atmosphere.

Discharge position: Pressure in tank—hose on drain valve—two way valve closed—slide valve out closing intake to vacuum producer and opening ports to allow air to be drawn into vacuum producer from outside—three way valve closed delivering air into tank under pressure.



The Spencer SUMP-VAC Cleans Sumps in 2 to 10 Minutes

A Spencer vacuum producer mounted on a closed tank on wheels removes all liquid and sludge from sump tanks in two to ten minutes compared with half an hour with former methods. The rate of pick up is 40 gallons of liquid per minute.

The tank capacity is 125 gallons or enough for 3 to 5 average sumps. A filter basket collects chips and heavy sludge. A Neoprene float valve prevents overfilling of the machine. It is emptied by gravity in two minutes. By turning the valves provided with the machine and connecting the hose to the

drain valve, liquid can be discharged under approximately 3 lbs. pressure. This permits raising the liquid to a height of 6 ft., emptying the tank into a drum or other container for easy disposal.

No priming is necessary—and all material in the sump tank is cleaned out by air vacuum after the liquid is removed.

Sizes $\frac{3}{4}$ or $1\frac{1}{2}$ horsepower, universal or single phase motors, 25 to 60 cycles, 110 or 220 volts or d.c.; $12\frac{1}{2}$ foot vacuum hose lengths and 50 foot cable extension. Ask for the bulletin.

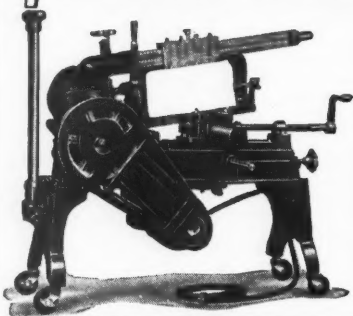
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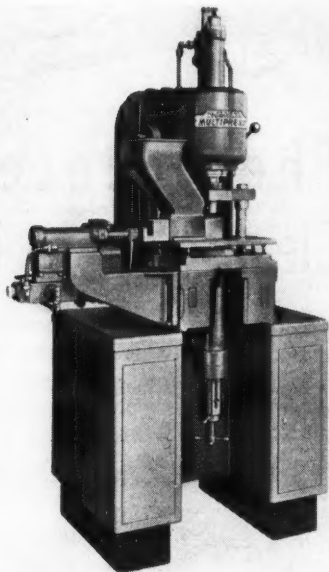
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MILLER-KNUTH MFG. CO. OMAHA, NEB.

$\frac{1}{2}$ inch. The maximum rate of ram travel is 200 inches per minute down and 300 inches per minute up. During the last 2 inches of ram stroke pressure downward, the speed can be reduced any place in the range downward to 40 inches per minute. Through this adjustment, it is possible for a forming punch to approach a die rapidly and then be slowed down just as it enters the die.

An individual pressure regulating adjustment is provided for the ejection ram.

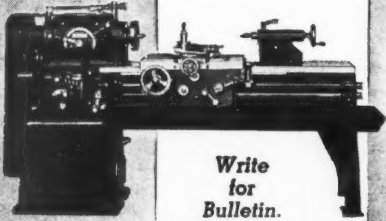


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**CARROLL
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**12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.**

**Modern Design—
Liberal
Dimensions.**



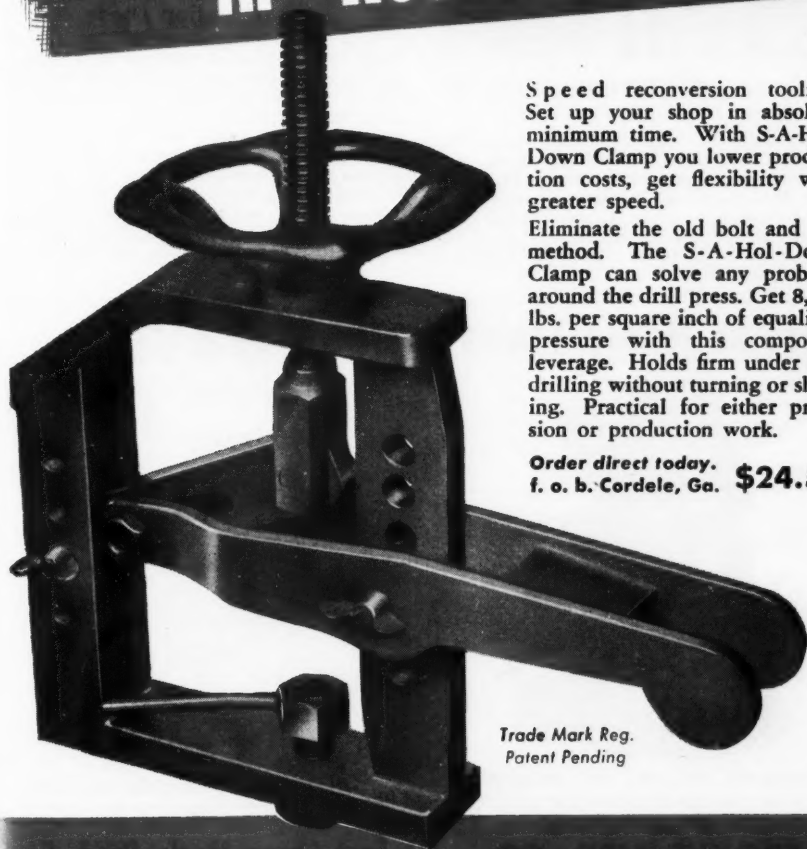
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for
Bulletin.**

**THE CARROLL & JAMIESON
MACHINE TOOL CO.**

In addition, an adjustment provides for maintaining the ejection ram in the full upstroke position long enough to ensure that the pressed and ejected part is removed from over the die cavity before the feeding ram retracts.

Accurate and variable die fills can be obtained by raising or lowering a bottom stop adjustment in the knockout cylinder. Die fills up to 3 inches in depth may be obtained and dies up to 4 inches in diameter can be accommodated on the press shown. Different filling boxes utilizing the same feed hopper can be provided in variable widths and heights so that the minimum pressing ram stroke for a particular operation can be used.

S-A-Hol-Down Clamp Secures Work Pieces in Record Time!



Speed reconversion tooling. Set up your shop in absolute minimum time. With S-A-Hol-Down Clamp you lower production costs, get flexibility with greater speed.

Eliminate the old bolt and bar method. The S-A-Hol-Down Clamp can solve any problem around the drill press. Get 8,000 lbs. per square inch of equalized pressure with this compound leverage. Holds firm under fast drilling without turning or shifting. Practical for either precision or production work.

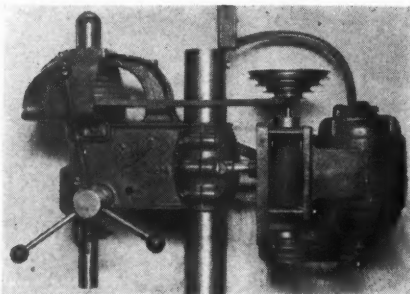
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DEPT. 5, CORDELE, GEORGIA

Cardinal No. 18 "Slo-Drive"

The Cardinal No. 18 "Slo-Drive" pictured herewith, product of the Cardinal Machine Co., Glendale, Calif., is designed



Cardinal No. 18 "Slo-Drive"

to increase the capacity and versatility of popular makes of drill presses. Applied to any common make of 18 to 20-inch drill press, it is said to reduce the spindle speeds to a range which will allow for the accommodation of drills and other tools up to 1 inch in diameter

or larger. The actual speed reduction ratio is claimed to be nearly 3:1 below the normal range of such machines.

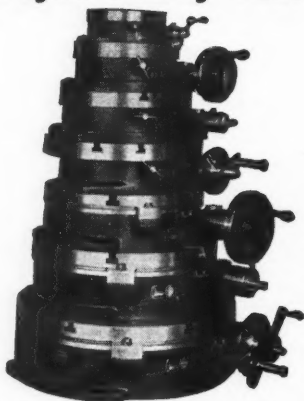
The Cardinal No. 18 Slo-Drive is a compact standardized unit which can be easily installed on most makes of drill presses in the above size range and will accommodate any motor. All parts required for the installation are included with the unit, which is rated at 1 h.p. capacity. Construction features include an alloy steel countershaft, heavy duty steel and semi-steel 2-groove drive pulleys, and precision sealed ball bearings.

Crescent Segmental Type Lamination Dies

The Crescent Tool & Die Co., Lincoln Park, Mich., is now engaged in the manufacture of segmental type lamination dies which feature removable and replaceable punches and segments. According to the manufacturer, the removable feature eliminates the necessity of replacing the entire punch build-up when one or more segments become worn. Only the worn places need be replaced, thus making possible considerable savings to the user.

In addition to precision-made dies, the

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Sizes 9", 12", 15", 18", 21", 25"

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835 East 140th Street - Cleveland 10, Ohio, U.S.A.

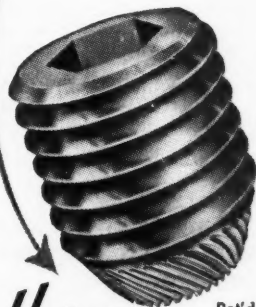
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UNBRAKO

Reg. U. S. Pat. Off.

*means better-performing machines,
less maintenance, speeded assembly.*



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Knurling of Socket
Screws originated with
"Unbrako" in 1934.

The Knurled Point of the "Unbrako" Socket Set Screw makes it a Self-Locker . . . the knurled point digs-in and holds firm, in spite of the most stubborn vibration! Yet, this screw can easily be backed-out with a wrench and used again and again.

The Knurled Head of the "Unbrako" Socket Head Cap Screw provides a slip-proof grip, even for oily fingers. A time-and-money-saver...it can be screwed-in faster and farther, before it becomes necessary to use a wrench, and it "dolls up" the looks of any piece of machinery.



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Both screws in sizes from No. 4 to 1 1/4"; write for the free "Unbrako" Catalog. "Unbrako" and "Hallowell" products are sold entirely through distributors.



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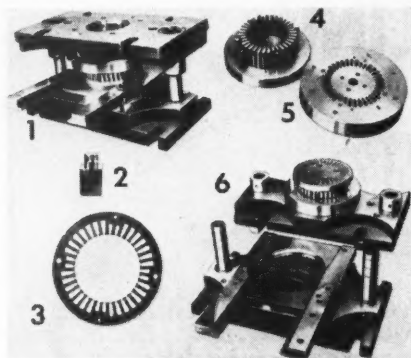
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company maintains extensive facilities for the design and manufacture of a wide variety of tools, fixtures, and gages

conforming to American Gage Design Standards—is also available. These and special gages are furnished with or without carbide inserts and with or without chromium plating.



Crescent Segmental Type Stator Lamination Die. (1) Front view of die assembled, (2) die segments shown on block, (3) the stator lamination, (4) punch build-up, (5) die build-up, and (6) complete assembly in open position.

to user specifications. A complete line of standard plug, ring, flat plug, profile, flush pin, snap, and build-up gages—all

Bruno Adjustable Circle

An all-purpose adjustable hole-cutting tool for use in steel, brass, hard rubber, aluminum, fiber, plastics, and other materials is announced by Bruno Tools, 9330 Santa Monica Blvd., Beverly Hills, Calif. The tool can be used to cut holes of any diameter from $1\frac{1}{4}$ to 8 inches through $\frac{1}{4}$ -inch thicknesses in steel or other tough metals and any thickness up to $1\frac{1}{2}$ inches in plastics, fiber, or wood. (Thickness capacities may be doubled if cut is made from both sides of the material.)

Constructed for operation in any standard drill press or suitably mounted spindle machine, the Bruno Adjustable Circle Cutter consists of a combination drill and pilot with an improved high speed cutting blade which is adjustable to depth and diameter. The exclusive Wedge-lok cutting blade holder permits

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Screw machine operators, supervisors & other personnel. The course starts with machine elements, covers Brown & Sharpe operations from simple form and cut-off jobs through difficult, complicated screw machine problems. Charts, graphs, and diagrams simplify actual cam layout.

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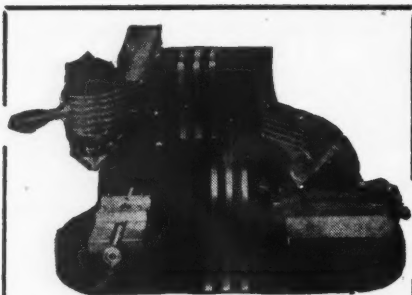
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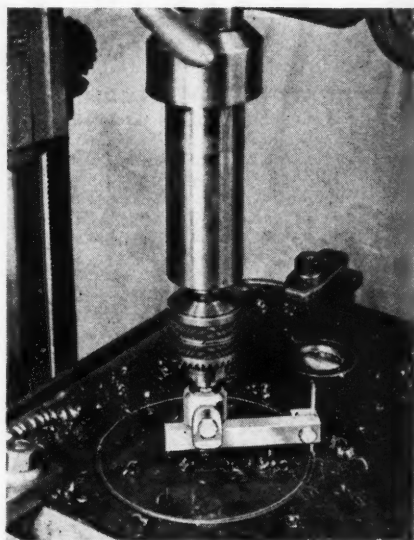


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the cutting edge to recede or yield from the work while still maintaining steady pressure and feed. The cutting blade can be easily resharpened without special tools by grinding on one edge



Bruno Adjustable Circle Cutter

only. The twin-blade holder (fixed $\frac{1}{2}$ -inch center) can be used to cut washers, wheels, discs, and gaskets in one operation.

Hanna Air and Hydraulic Control Valves

A series of three valves for air and hydraulic equipment is announced by the Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill. Included is a packless $\frac{1}{4}$ -inch capacity valve, known as the Hanna Unitite Jr., for tubing and light piping applications. It is a smaller model of Hanna's standard Unitite Valve. Precision built and permanently tight, it is designed for 4-way operation but may be used as a 3-way valve by plugging one port. Suitable for air, oil, or water at pressures up to 250 p.s.i., with an 80-degree handle movement providing for complete reversal, the valve is available for manifold, column, or panel mounting.

The Hanna Foot-Operated Valve, also included in the series, is described as a

STOP DUST WITH DUSTKOPS



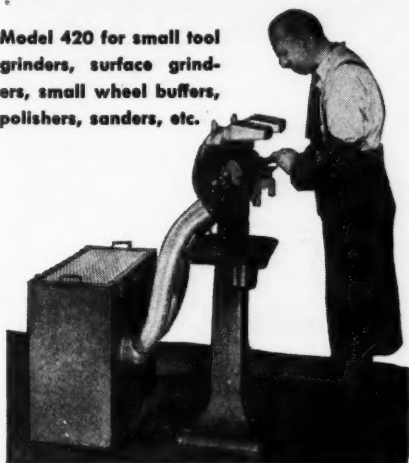
Model 1150 DUSTKOP Dust Collector collects all the chips (note pile in back of DUSTKOP) from aluminum extrusion cut-off. Paddle wheel fan direct driven by continuous duty motor clears any size chip or shaving; cyclone separator for a first stage cleaning is followed by spun glass filtering of air before recirculating to work space.

DUSTKOPS require no duct work: Install in minutes.

New style, low cost, spun glass filter, is fire-safe, easy to shake down and seldom needs renewing.

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Model 420 for small tool grinders, surface grinders, small wheel buffers, polishers, sanders, etc.



Ask for complete information NOW on DUSTKOPS.
DUSTKOPS are LOW IN COST, EASY TO INSTALL, FULLY PORTABLE



Hanna Air and Hydraulic Control Valves

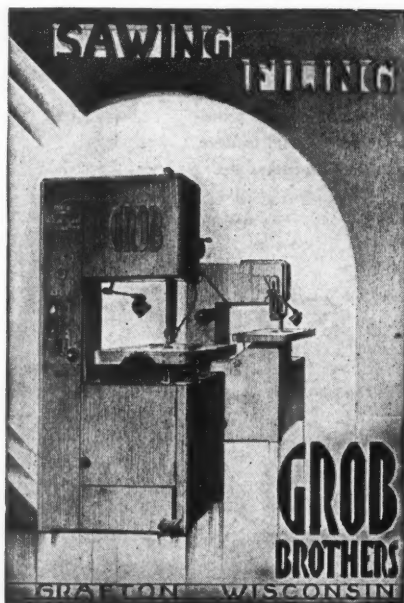
designed to operate on 250 p.s.i. air pressure or 1,000 p.s.i. oil pressure.

The control of cylinder piston speed in both directions is accomplished by the third valve in the series—the Hanna Two-Direction Speed Control Valve. It provides for adjustable control of inflow and outflow of air or oil independently to and from one side of the piston. One valve is used for oil operation; two are recommended for air. Working pressures are 250 p.s.i. for air cylinders and 1,000 p.s.i. for hydraulic cylinders. Pipe sizes available are $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1-inch.

packless, effortless control for use in air and oil hydraulic cylinder applications. Freeing hands for other work, it is made in two styles—one with single pedal for constant cycles of operation, and another with split pedal that holds position until tripped for reversal. Available in $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1-inch sizes, the valve is

Attachments for Hager Carbide Tool Grinder

A complete line of specially designed attachments which extend the application range of the Hager Carbide Tool Grinder to the grinding of milling cut-

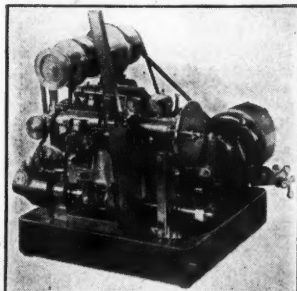


WALTHAM

Pinion and Gear Cutting Machines

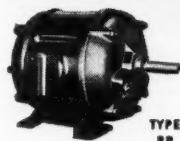
with revolving cutter will make 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to $1\frac{1}{2}$ " dia. Revolving cutter makes successive cuts on blanks held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

WALTHAM MACHINE WORKS
WALTHAM MASS.

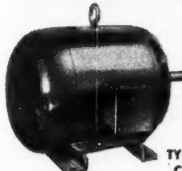


Wagner Polyphase Motors

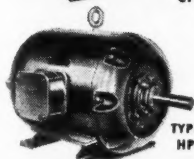
Offer a Wide Choice of Electrical and Mechanical Types



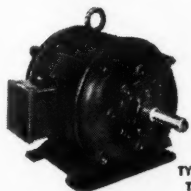
TYPE
RP



TYPE
CP



TYPE
HP



TYPE
TP



TYPE
RS

Fitting the right motor to the job is not always a problem of designing and building a *special* motor, but it is usually one of selecting a standard design of motor which is qualified to give the best account of itself.

Wagner polyphase motors are built in such a wide range of mechanical and electrical types that with few exceptions you can select a standard Wagner polyphase motor that exactly meets the requirements of the job.

SINGLE-SPEED SQUIRREL-CAGE

TYPES	ELECTRICAL CHARACTERISTICS	APPLICATIONS
RP-1, HP-1, TP-1	Normal starting-torque—normal slip	Group or individual drives on machine tools, fans and blowers, compressors, centrifugal pumps—on any application where normal-torque motors are satisfactory.
RP-5, CP-5, HP-5, TP-5	High starting-torque—normal slip	Crushers, plunger pumps, belt conveyors starting under load, large air compressors, large refrigerating machinery, mixers, and other applications requiring high starting-torque.
RP-6, CP-6, HP-6, TP-6	High starting-torque—high slip, punch press	Punch presses, shears, metal-drawing machines, balers, and other machinery equipped with flywheels or having flywheel effect.
RP-7, CP-7, HP-7, TP-7	High starting-torque—high slip, elevator	Elevators, cranes, hoists, dumbwaiters.
TYPES	MECHANICAL CHARACTERISTICS	APPLICATIONS
RP-1, CP-5, HP-6, TP-7	Open—ventilated	For applications where atmospheric conditions permit use of open-type motors.
CP-1, CP-5, TP-1, TP-5, TP-7	Totally-enclosed, fan-cooled	For locations where dust, abrasives, steel chips, flings, acid fumes, moisture, and other harmful elements are present.
HP-1, HP-5, HP-6, HP-7	Explosion-proof	For Class I Group D hazardous locations where gasoline, petroleum, naphtha, alcohol, acetone, lacquer, solvent vapors, natural gas, and other flammable liquids are manufactured or handled.

MULTISPEED SQUIRREL-CAGE

TYPES	ELECTRICAL CHARACTERISTICS	APPLICATIONS
MSP-1 to -7, MCP-1 to -7, MTP-1 to -7, ATP-1 to -7	Two, three, or four speeds, in 3 types: Constant Horsepower Constant Torque Variable Torque	For applications involving two, three, or four speeds. Frames varied as listed under "Mechanical Characteristics", and electrically varied as listed under "Electrical Characteristics" shown for single-speed motors above.

WOUND-ROTOR

TYPES	ELECTRICAL CHARACTERISTICS	APPLICATIONS
RS-1	General Purpose Continuous Duty	Conveyors, compressors, pulverizers, etc., requiring continuous operation.
RS-2	Crane & Hoist Intermittent Duty	Elevator, crane, hoist, and like services which operate intermittently.

For complete information on Wagner motors write for Bulletin MU-185, addressing your request to Wagner Electric Corporation, 6448 Plymouth Avenue, St. Louis 14, Missouri.

Send today for your free copy of Bulletin MU-185 which gives complete information on Wagner Single-phase, polyphase, and direct-current motors.

MA-178

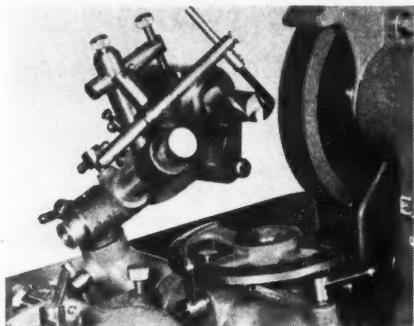
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ters, counterbores, inserted tooth face mills, spiral reamers, end mills, and other special type carbide-tipped tools



Grinding the front face of a 1-inch diameter high speed steel spiral end mill with No. 30 standard taper in the Hager Carbide Tool Grinder using a specially designed attachment.

has been placed on the market by E. F. Hager & Son, Queen Village, New York.

Engineered for flexible and simple setups, the attachments are said to assure

constant, fixed control of the tools throughout the grinding operation and enable the operator to work out innumerable arrangements to suit his individual requirements. All free-hand grinding is said to be eliminated and a keen, straight-cutting face readily obtained.

Elliott Flexible Shaft Machine

A portable flexible shaft machine for use in performing sanding, polishing, cutting, grinding, and finishing operations on all metals as well as plastics, porcelain, and other materials is now being marketed by the Elliott Manufacturing Co., Binghamton, N. Y. Available in pedestal, suspended, and bench types, the machine can be obtained with a wide variety of accessories and interchangeable handpieces for working in corners and irregularly shaped parts.

Constructed for easy operation by unskilled workers, the Elliott Flexible Shaft Machine is accurately balanced and can be swiveled or tilted in any direction, thereby relieving the operator of the full weight of the handpiece and shaft. Ball bearing equipped to assure smooth operation, the machine is fully

BAUMBACH

THE DIE SET AUTHORITY

All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

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ELLIOTT Flexible Shaft MACHINES

Now, you can do your jobs better, faster and more economically with Elliott Flexible Shaft equipment.

Portable with quickly interchangeable tools, these machines are particularly useful for heavy grinding, cleaning welds, drilling, die finishing, rotary filing, cutting and similar operations.

Elliott Flexible Shaft Machine operators can reach places inaccessible to machine tools or power driven hand tools and can work large, unwieldy parts.

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ESTABLISHED 1932

ELLIOTT MANUFACTURING COMPANY
211 PROSPECT AVE. BINGHAMTON, N. Y.

HEAT TREAT SMALL PARTS

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ESSENTIAL FOR TOOL AND DIE SHOPS

You save time and money heat treating small tools and dies in a Cooley Electric Furnace. Uniform temperatures are maintained throughout the furnace chamber to assure even heating of parts. The heating elements are embedded in refractory materials, protecting against atmospheric attack. They are easily replaceable.

ECONOMICAL TO OPERATE

To hold 1600° F. in the MH-3 furnace requires less than 2 kw. At power rate of 2c per kw.-hr., operating cost is under 4c per hour. The MH-4 furnace requires less than 2.5 kw. or under 5c per hour at the same rate. Cooley Furnaces are easily installed—ready for immediate service by connecting power lines to two terminals. Quiet in operation—no fumes or odors—no ventilating necessary—they can be located at any convenient place in the shop.



TWO NEW OPTIONAL FEATURES AVAILABLE



1. Vertical Lift Door—Counter weighted for ease of operation—conserves heat where door need not be fully opened to enter or remove work. Supplied in place of standard hinged hearth door at \$20.00 additional to regular furnace prices shown below.



2. Heavy Gauge Steel Stand—For ease of installation and operation—locates furnace at most convenient operating height and provides additional working and storage space. Add \$35.00 to regular furnace prices shown below.

AVAILABLE IN TWO SIZES

Type	Chamber Capacity	Amps 115 V	Watts	Amps 230 V	Price
MH-3	8"W 6"H 14"L	29.6	3400	14.8	\$146.00*
MH-4	10"W 6"H 18"L	4800	20.9	\$222.50*
*Includes Hearth Plate					

MAX. SAFE TEMPERATURE—Continuous operation, 1750° F.; Intermittent operation, 1850° F.
AUTOMATIC CONTROL—Indicating Controlling Pyrometer—Thermo-couple and lead wire—approximately \$150.00.

NO SALESMEN WILL CALL

Ask for free information and ordering instructions so you can make your own decision and determine your own requirements. Write for Bulletin No. 50 today—no obligation.



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34 South Shelby Street Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.

Export Manager, 44 Whitehall Street, New York, New York

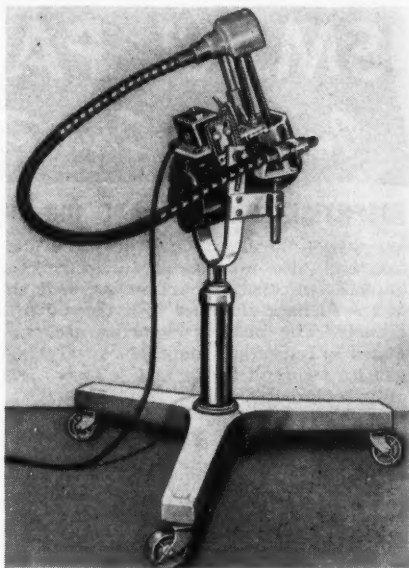
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Abrasive Belt
PEERLESS
Surfacers**

•Peerless vertical surfacing machines provide both fine quality of work and speed in surface grinding. Furnished in 9", 14" and 20" sizes, with either belt or motor drive.

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guarded and features a spring tension device that permits rapid positioning of the driving belt on the step pulley for

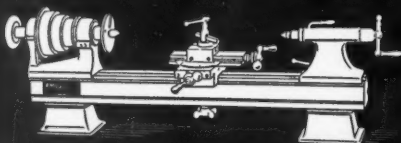


Elliott Flexible Shaft Machine

AMES Precision BENCH LATHE

Known for 40 years as a precision lathe of the highest quality. Bed 36" long. Ball bearing headstock uses 1" capacity collets. Swing 8 $\frac{3}{8}$ " over bed. Available with motor drive.

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WALTHAM 54, MASS., U. S. A.**

speed changes. As a result of unusual flexibility and strength, the core of the unit is said to rotate easily and freely even when turning in a small radius.

"Flectrol" Remote Control

Product of the Yardeny Laboratories, Inc., 105 Chambers St., New York 7, N. Y., the "Flectrol" illustrated herewith provides for finger-tip remote control of speed when applied to commercial speed changers. The dial can be set instantaneously to any desired speed, and the speed changer will follow as fast as the electric Servo motor can drive the speed adjusting screw, it is claimed. The dial can be calibrated in revolutions per minute, gallons per hour, and so on. According to the manufacturer, any speed within the range of the changer can be selected with an accuracy of better than 2 per cent.

In operation, the Flectrol controls the rotation of the small motor used to adjust the pulleys or gears of the speed changer. Rotation of the speed selector dial causes



All-Purpose Sanding Disc

Tough sharp grains of tempered aluminum oxide are combined with heat resisting phenolic resin on a resin impregnated fibre backing to make this moisture-proof, fast-cutting, longer-life disc.

Even with continuous cutting action, this sanding disc will run cool and clean. It reduces the drudgery of sanding jobs and saves time. It has amazing flexibility for concave, convex and reverse curve sanding.

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SIOUX PHENOL ABRASIVE DISC

CUTS FASTER • LASTS LONGER

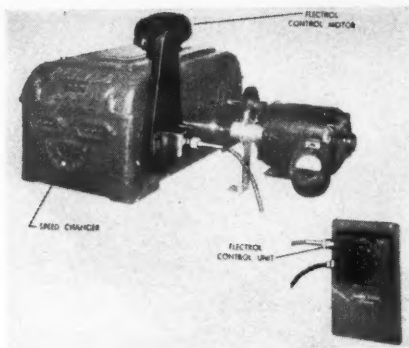
STANDARD THE



WORLD OVER

ALBERTSON & CO. INC.

SIoux CITY, IOWA U.S.A.



Typical "Flectrol" application on a continuously variable speed transmission

this motor to drive the adjusting screw until the output speed of the controlled device corresponds to the speed selected on the dial. The accompanying illustration shows the Flectrol applied to a Reeves size "00" horizontal enclosed speed changer.

Of simple, rugged, and compact design, the Flectrol Remote Control is applicable

to new or existing equipment. It can also be built in or added to motor-operated valves, machine tools, printing presses, conveyors, and other equipment having motor-operated adjustment.

Knu-Vise Series P-400 Toggle Pliers

Designed particularly to hold work for welding, drilling, riveting, and sub-assembly where space for such operations is limited and where parts being held are small, a toggle pliers designated as the Series P-400 is announced by Knu-Vise, Inc., 2201 8th St., Detroit 16, Mich. The device is offered in four styles: P-400 with throat gap of $1\frac{1}{8} \times 1\frac{1}{8}$ inches; P-401 with throat gap of $\frac{1}{2} \times 1\frac{1}{8}$ inches and with spindle having rubber cap; P-402 with throat gap of $\frac{1}{8} \times 1\frac{1}{8}$ inches and with two rubber caps; and P-400 VG a vari-grip spring type that can be set for loads varying from 10 to 40 pounds.

According to the manufacturer, a normal 40-lb. pressure of the hand applied on the handles of the Knu-Vise Toggle Pliers will multiply to a pressure of 400 lb. at the work contact—a ratio of 10 to 1. The pressure spindle has a screw

25 YEARS OF

PERFORMANCE

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So many Buy*

FORD FILES

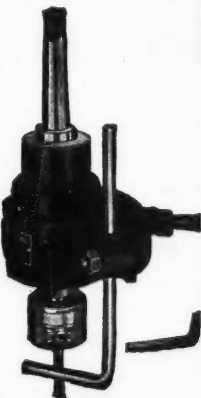
M. A. FORD MFG. COMPANY, INC.
744 W. FIRST STREET DAVENPORT, IOWA

CHANGE a drill press into a tapper in 1 min.

Thrust a No. 1, 2 or 3A Dorman Tapper into the spindle of your drill press ...insert the proper tap, tighten **ONE** set screw, adjust drill press speed and you are ready to tap holes up to $1\frac{1}{4}$ ".

The adjustable friction drive #1 tapper drives from 2-56 to $\frac{3}{16}$ " tap in steel or any other material. Simple adjustment changes from light friction to positive or any intermediate drive. #2 positive tapper drives from $\frac{3}{8}$ " to $\frac{1}{4}$ ". #3-A positive tapper drives from $\frac{1}{2}$ " to $1\frac{1}{4}$ ".

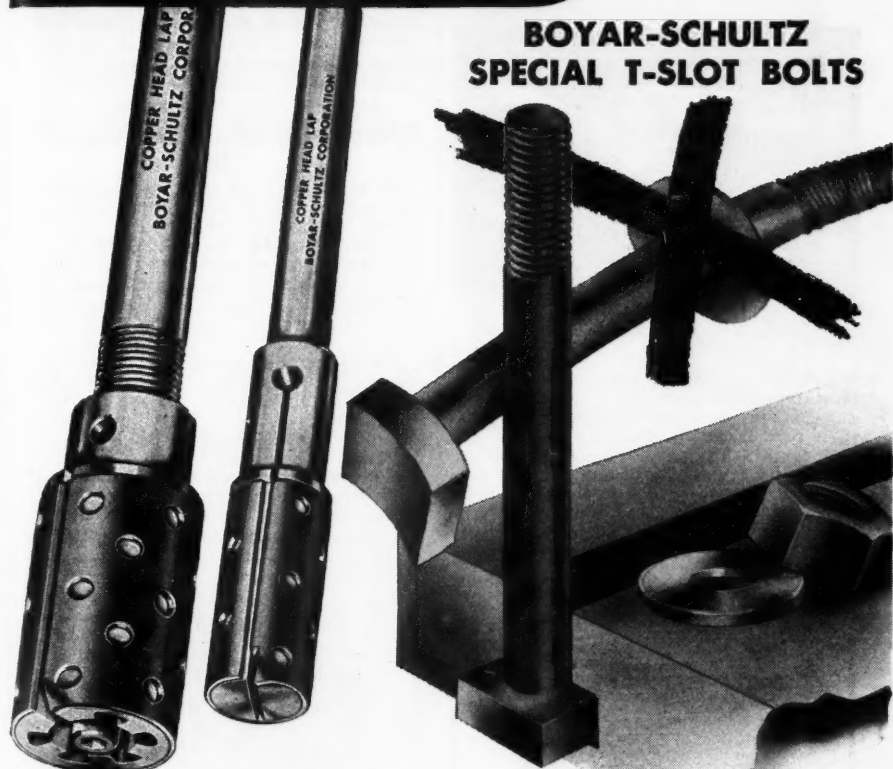
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DORMAN MACHINE TOOL WORKS
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COPPER HEAD LAPS

BOYAR-SCHULTZ SPECIAL T-SLOT BOLTS



... They pay for themselves in time saved! They work fast; they never wear out. The only wearing part is the replaceable sleeve. Sleeve adjustment feature permits maintaining correct lapping size till worn out and replaced with a new sleeve. Costly toolroom time is saved by using Boyar-Schultz Copper Head Laps. Available from stock in standard sizes $\frac{1}{8}$ " to $2\frac{1}{2}$ ".

"Avoid Deliberate Ruin of Machinery"

"Most metal working machinery is provided with T-slots in Tables for fastening work. In modern production these T-slots are completely finished by milling or planing; consequently every surface is finished smooth and square. But when machines are put in operation, any kind of hodge-podge bolt is used for fastening work. It does not take long to ruin T-slots with such bolts, and after that has happened, a most essential part of the machine is ruined. The cost of proper bolts is very small, and I hope that my observations expressed here will reach the men in authority to *avoid this deliberate ruin of American Machinery.*"

Above is from a letter to Tool Engineer, January 1946. Boyar-Schultz Special T-Slot Bolts are made from upset forgings of heat treated alloy steels. Machined heads are square with bodies to present a clean flat surface to T-slot. Threads are carefully cut. For best results use Nuts and Washers made for use with Boyar-Schultz Special T-Slot Bolts.

BOYAR-SCHULTZ CORPORATION • 2120 Walnut St. • Chicago 12

driver slot to facilitate adjustment. The handles are designed to come together to a definite locking stop when work is



Knu-Vise P-402 Toggle Pliers

being held and are curved to make gripping from extreme open position easy and comfortable. The shape of the pressure pad is such that the rubber cap will remain secure in its fixed position, and its practically flat base will not produce a depression mark in the work held, it is claimed. The nut for locking the spindle adjustment is positioned directly

above the boss on the outer side of the pliers so that pressure is exerted against the boss rather than against the nut.

Made of steel forgings and cadmium plated, the Knu-Vise Toggle Pliers measures $4\frac{1}{2}$ inches long overall x $1\frac{1}{4}$ inches high (exclusive of spindle) and weighs 4 ounces.

Woodworth "Miniature" Cone-Lok Jig

To meet the need for a standard clamping jig for use in machining very small parts, the N. A. Woodworth Co., 1300 E. Nine Mile Rd., Detroit 20, Mich., has introduced a "Miniature" Cone-Lok Jig which, despite its size, is claimed to be of rugged construction, exceptionally safe in operation, versatile, and to possess a minimum of moving parts.

Featuring hardened and ground alloy steel working parts, the jig, according to the manufacturer, can be assembled or dismantled in a very few minutes, with no special skill or tools required, and can be converted from right to left-hand operation in two minutes, using no additional parts. The moving parts operate in an oil bath which is designed to prevent chips and cutting oils from

QUICK DELIVERY
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COLONIAL BUSHINGS, Inc.
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**COLONIAL
DRILL JIG BUSHINGS**

ARMSTRONG-BRAY GEAR and WHEEL PULLERS
Essential Tools Prompt Shipment
because they save hours of time, prevent costly breakage and long shut downs.
STEELGRIP Standard Rigid Arm Gear and Wheel Pullers are of improved design. Will not slip from work. Arms are forged and heat-treated. 2-arm, 3-arm and special designs. 34 types and sizes. CHAINGRIP Universal Pullers pull wheels, solid gears, pinions, etc., even at considerable distance from end of shaft. Proof-tested chains have both chain hooks and special pulley hooks. 3-ton and 12-ton capacities. Write for Catalog Sheets.
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"The Belt Lacing People"
5346 Northwest Highway Chicago 30, U.S.A.

NEW PYRALIN TIPPED MALLET



Solid, "non-sparking, non-magnetic alloy head," threaded at both ends.

Threaded plastic tips can be screwed in by hand. Oval hole drilled in hammer head prevents handle from coming off or turning.

When buying mallets be sure to buy SOUTHWEST and get the original.

Send \$1.00 and name of your nearest dealer, for prepaid sample mallet.

SOUTHWEST MFG. CO.

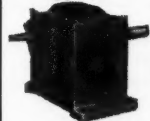
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MOST MODERN speed reducers—duties 1/50 to 417 H.P. Input or output for installations to fit all conditions. Worm, Spur, and Combination types.

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CAPEWELL

Handbook Helps

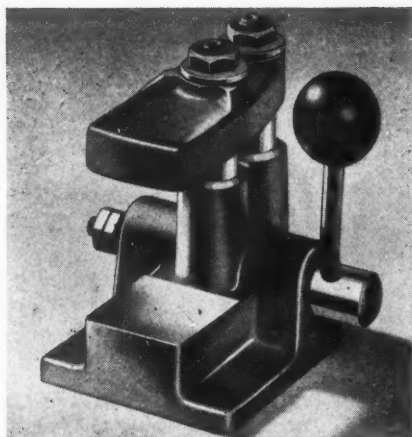
You Obtain Greater Cutting Efficiency

This helpful little booklet—just off the press—is being given FREE to all hack saw and band saw users.

Turn to pages 3 to 8, for example. Here you'll learn how you can prolong the life of your power hack saw blades. Similar information on hand blades and band saw blades.

Ask your local Capewell distributor for this handy booklet today.

THE CAPEWELL MANUFACTURING CO.
HARTFORD, 2, CONN.



Woodworth "Miniature" Cone-Lok Jig

coming in contact with any of the internal parts, thus avoiding damage and excessive wear.

The Woodworth Miniature Cone-Lok Jig is so constructed that movement of

working parts is said to be impossible without action of the operating lever. The tray can be positively locked at any location in up or down strokes, and any sudden weight or pressure applied to the tray instantly throws a second Cone-Lok into action, thus securing the tray at the original position. The jig is available in two sizes for working areas of 1 x 1 x 1 inch and 1 x 2 x 1 inch.

Samson Grinding Wheel Dresser

A grinding wheel dresser with forced-feed lubrication is now being marketed under the trade name of Samson by the G. J. Wallen Manufacturing Co., 617 Bryant St., San Francisco 7, Calif. The bearings and cutters of the unit are completely sealed in pressure-fed grease, the pressure of which is said to prevent grit from feeding back into the dresser; so that long dresser life is assured.

According to the manufacturer, accuracy is assured throughout the life of the Samson Grinding Wheel Dresser since bosses provided on each side prevent any side play. Thus, the operator can "peel" or start at one side of the wheel and work

*Specify
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HIGH TORQUE

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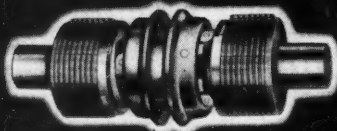
POSITIVE NEUTRAL

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LONG WEAR LIFE

EASY ADJUSTMENT

ROCKFORD
PULLMORE



MULTIPLE-DISC
CLUTCHES

* High-ratio operating levers give PULLMORE clutches powerful engagement with slight axial pressure and short movement of the shifter spool, consequently operation is quick and easy. De-clutching is equally fast and positive. The shifter

spool has an extra deep slot which is hardened and ground. This prolongs the life of the clutch, reduces wear on the shifter fork and holds run-out to a minimum.

Send for This Handy Bulletin

It shows typical installations of **ROCKFORD CLUTCHES** and **POWER TAKE-OFFS**. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications. Every production engineer will find help in this handy bulletin

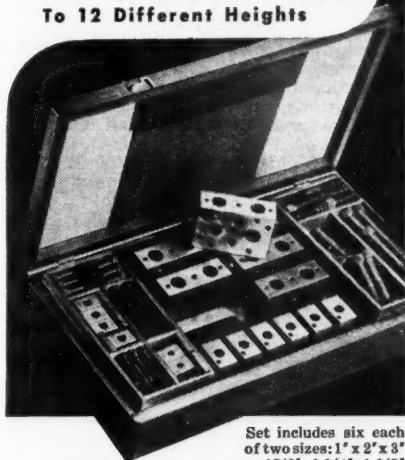


ROCKFORD CLUTCH DIVISION BORG-WARNER

300 Catherine Street, Rockford, Illinois, U. S. A.

SOMETHING NEW IN 3-WAY PARALLEL SET-UP BLOCKS

One Handy Set Speeds Set-ups
To 12 Different Heights



Set includes six each
of two sizes: $1'' \times 2'' \times 3''$
and $7/8'' \times 1-1/4'' \times 1-1/2''$

This handy, compact set of Moore 3-Way Parallel Set-up Blocks takes the place of a large number of conventional parallels. Each block may be used in any of its three dimensions to build up to 12 different heights.

Spaced *around* the work-piece to provide support, parallel or perpendicular to working surfaces, they eliminate sagging, localize stresses and hold work rigidly throughout the machining operation. And they may be placed to avoid interference with holes being bored or ground.

Moore 3-Way Parallel Set-up Blocks are carburized chrome-nickel steel, finish-ground to $+.0002''-.0000''$. Sides are parallel within $.0001''$, perpendicular within $.0002''$. Write for descriptive literature.

MOORE SPECIAL TOOL CO., INC.
730 Union Ave. • Bridgeport 7, Conn.

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BORER AND MOORE JIG GRINDER



ARGUTO OILLESS BEARINGS



... IN MANY DIFFERENT
APPLICATIONS

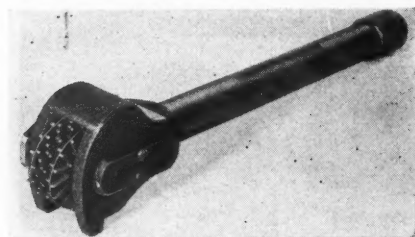
**"OUTWEARS THE BEST
BRONZE METAL"**



ARGUTO OILLESS BEARING CO.

WAYNE, MICHIGAN • PHILADELPHIA

toward the other side, cutting under any soft metal, such as aluminum or lead, with which the wheel may have become



Samson Grinding Wheel Dresser

"loaded." Grease that accumulates within the head of the dresser catches the dust or fine grit which is present when dressing or truing wheels and prevents it from being inhaled by the operator, the manufacturer claims. Grease, it is claimed, does not accumulate on the grinding wheel but is thrown off by centrifugal force.

Bearings and bosses of the dresser are made of unusually tough steel which is

hardened to provide for long life. One of the bosses is adjustable for taking up any side play in the cutters. The dresser is available in two sizes; namely, No. 1 for use on wheels up to 12 inches in diameter and 2-inch face, and No. 2 for wheels up to 60-80 grit and of diameters down to three inches.

"All-Out" Dry Chemical Fire Extinguisher

Designed to combine high efficiency under most conditions with maximum protection to the user and to equipment installations, the "All-Out" Dry Chemical Fire Extinguisher illustrated herewith, product of Pressurelube, Inc., All-Out Fire Extinguisher Division, 609 W. 134th St., New York 31, N. Y., is said to perform effectively under all climatic conditions, in extreme temperatures, and in the presence of winds or drafts.

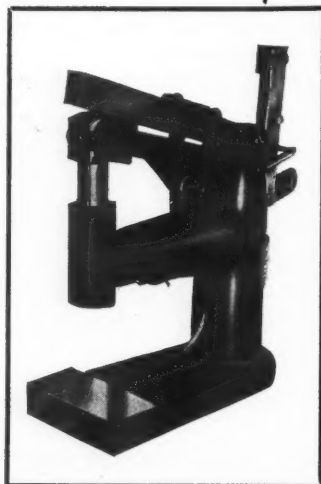
With the extinguisher, dry chemical is ejected, under pressure, in a flat stream that separates the flame from the burning material. Instantly forming a dense, fire-smothering cloud over a flaming area up to a distance of 18 feet, the chemical creates a solid barrier be-

AUTOMATIC STAKING MACHINE

**Does More Kinds of Jobs . . .
And Does Them Better Than
Any Other Conventional Riveter
You Ever Saw**

It does it—so uniformly, so efficiently, so rapidly.

Three sizes to do a multiplicity of jobs. Adjustable to give the right blow for each particular job. Ideally suited for staking of fixed or movable joints.



	1	1-B	2
Stroke	2"	2"	2½"
Spindle	1"	1"	1¼"
Throat Depth	4¾"	4¾"	8½"

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TEMCO ELECTRIC FURNACE

**HANDY
PORTABLE
FAST HEATING
UNIFORM TEMPERATURE**

MODEL GRP

FAST HEATING—1500° F. in 30 min. Temperature controlled by four point switch set for 500°, 1000°, 1500° and 1850° F. These settings easily changed by adjusting bands on rheostat coils. Dependable indicating pyrometer is calibrated in both Fahrenheit and Centigrade scales.

UNIFORM TEMPERATURE—Heating element of highest quality nickel-chromium alloy forms a continuous coil and is embedded in sides, top and bottom of muffle chamber. This construction assures uniform temperature and protects element from damage and oxidation. Complete muffle unit is replaceable.

PORTABLE—Body is aluminum. Total weight, 17 lbs. Muffle chamber, 4" x 3 3/4" x 3 3/4"; furnace overall, 9 1/4" x 13 1/2" x 10 1/2". Supplied with attachment cord. Operates on A.C. and D.C., 115 or 230 V. (be sure to specify voltage). Max. power consumption 1200 watts.

Model GRP complete, 115 V.....\$50.00

Model GRP complete, 230 V.....\$55.00

*Larger models available
See your supply house or write*

THERMO ELECTRIC MFG. CO., 488 W. Locust St., Dubuque, Ia.



TAP BREAKAGE *Reduced*

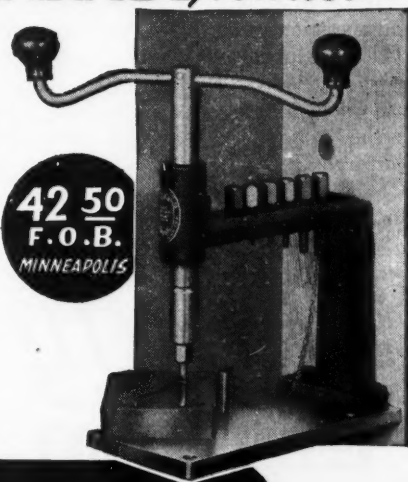
**Square, Straight Tapping
in Half the Time**

The Dahlstrom Tap Guide practically eliminates tap breakage and saves wasted hours getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Just fasten it to a post or bench, slip a Tap Adaptor into the spindle, and even an inexperienced operator can handle it. Equipped with 7 Adaptors, ranging from 8-32 to 1/2". Taps not furnished. Ask your mill supply house, or \$42.50 F. O. B. Minneapolis.

Literature on request.

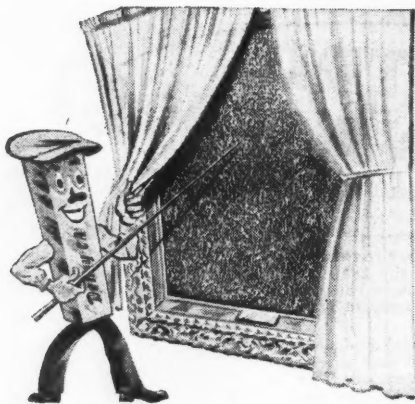
Dahlstrom Manufacturing Co.

418 South Sixth St., Minneapolis 15, Minn.



**42 50
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Dahlstrom TAP GUIDE



Portrait of **A TOUGH BABY**

This is Delloy CA (Cast Alloy), its dense, fine grain structure enlarged 400 times. An exclusive casting process provides the basic reason for Delloy CA superiority.

Tested in all types of practical machining operations, Delloy CA Rockwells 62-63 C scale, with a toughness superior to most cast alloys. It's the perfect tool to use when machining problems have you in the "middle" . . . when high speed steel burns and carbides chip.

Send for your *free* copy of the new Delloy catalog.

Delloy
METAL CORPORATION
CUTTING TOOLS

Affiliate of Ace Manufacturing Corporation
1201 East Erie Ave., Philadelphia 24, Pa.
Sales Representatives in all Principal Cities

tween the operator and the flame, thus providing protection from radiant heat, it is claimed. On hot metal surfaces, the dry chemical forms an insulated film, thereby helping to guard against dangerous reflash.

Said to meet the requirements of the Associated Factory Mutual Laboratories and Underwriters' Laboratories, the All-



"All-Out" Dry Chemical Fire Extinguisher

Out Dry Chemical Fire Extinguisher, according to the manufacturer, ejects a chemical which forms no toxic gases, is a non-conductor of electricity, non-abrasive, harmless to finished surfaces, and is easily removed with a brush. The extinguisher features a squeeze-grip nozzle for positive chemical control and is light in weight, thus enabling it to be easily carried and used by either men or women operators. Designed for easy refilling without the use of special tools or equipment, the extinguisher is equipped with 26 inches of 1/2-inch I.D. pressure hose that permits rapid maneuverability of the dry chemical stream.

Eynon-Dakin Oil Tube Cap

A self-sealing cap for oil tubes that is designed to permit easy one-hand oiling from any direction has been developed by the Eynon-Dakin Co., 1847 W. Bethune Ave., Detroit 6, Mich. Made of molded

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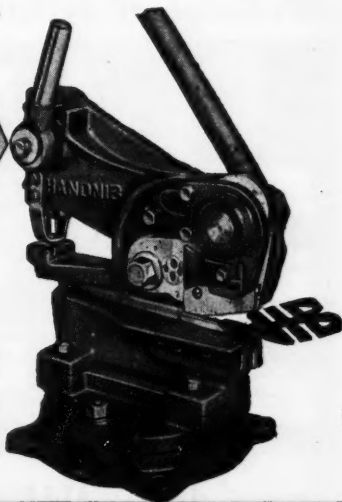
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**SHORT-CUT TO
IRREGULAR SHAPES**

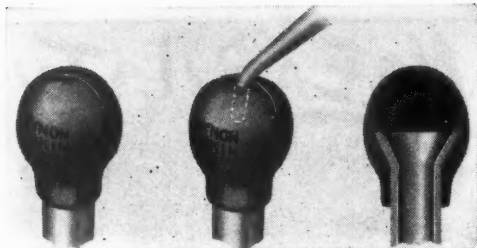
THE HEINRICH HEAVY-DUTY HANDNIB

**A Hand Operated Combination Nibbling, Shearing,
Punching and Rod Cutting Machine. (With swivel base)**

Capacity: Nibbling and Shearing 3/16" flat stock . . .
Punching Holes up to 1/2" in 1/8" sheets . . . Rod
Cutting 3/16", 1/4", 5/16" and 3/8" round
bars. Ask for Descriptive Folder.



THE NATIONAL MACHINE TOOL CO.
1536 CLARK STREET • RACINE, WISCONSIN



Ynnon-Dakin Oil Tube Caps

synthetic Buna "N" in various colors, the cap is described as tough, flexible, and completely oil resistant.

In use, the cap is applied to the slightly flared end of an oil tube or oil line and is permanently fastened by a combination of mechanical interference fit and synthetic cement. Proper positioning is provided for by an internal shoulder that rests on the flared end of the tube. Assembly is easily effected by means of a threaded tube end or by a press fit into the bearing housing.

The cap is designed to hold a supply of oil for slow seepage to the bearing, thus eliminating the need for frequent oiling. Dust and dirt are said to be positively

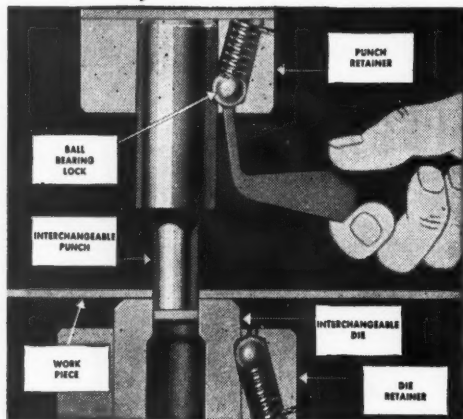
excluded by the tight sealing of the cap when the oil can spout is removed. In addition, the smooth dome-top design prevents the collection of dirt on top of the cap, it is claimed.

According to the manufacturer, no space is required for oiling beyond clearance for the cap itself, which is compact and streamlined and is available for oil tubes from $\frac{1}{8}$ to $\frac{1}{2}$ -inch outside diameter.

Govro-Nelson Axial Relief Grinding Fixture

Especially useful in grinding cutting edges, steps, flutes, and chip reliefs on milling cutters, burring tools, counterbores, countersinks, end mills, reamers, drills, and taps, the axial relief grinding fixture illustrated herewith has been placed on the market by the Govro-Nelson Co., 1931 Antoinette, Detroit 8, Mich. All adjustments on the fixture are externally located where they are readily vis-

The Original INTERCHANGEABLE PUNCH and DIE



Allied's R-B Interchangeable Punch and Die lowers costs

in the metal working and plastic industries. Standard punches and dies carried in stock. Special shapes and sizes in any material made to your specifications with prompt deliveries. Send for large illustrated R-B catalog, now.



ALLIED PRODUCTS CORPORATION

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BUTTERFIELD THRED-RITE DIES

The modern adjustable collet die at its best.

Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

For accuracy, speed and long life specify Thred-Rite.

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Factories: Derby Line, Vermont, U. S. A.
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"YANKEE" VISE

WITH SWIVEL BASE
FOR BENCH AND MACHINE

Removed from its swivel base, a "Yankee" Vise can be used in practically any position. You can drill or mill without removing the work from the vise . . . maintaining correct alignment from start to finish, avoiding time-consuming set-ups for each operation.

Made in four sizes, with a jaw opening from $1\frac{1}{2}$ " to 4"—each with a grooved V-block for holding round or irregular work. The time- and labor-saving feature of these vises is typical of all "Yankee" tools—screw drivers, braces, drills. Order from your industrial supplier, or write direct.

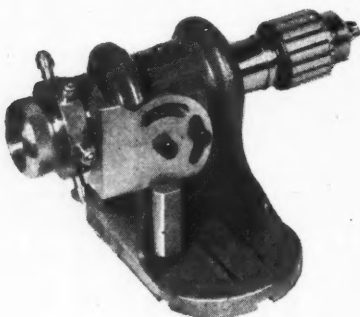
NORTH BROS. MFG. CO.
Phila. 33, U. S. A.

Established 1880

Division of The Stanley Works

ible and simply made, the fixture being instantly convertible from right to left hand and vice versa.

Applicable to surface grinders as well as cutter grinders, the Govro-Nelson



Govro-Nelson Axial Relief Grinding Fixture

Axial Relief Grinding Fixture allows for the performing of most grinding jobs with standard grinding wheels. The axial relief is said to be automatically equalized on all flutes.

Delloy Precision Castings

Precision castings of cast alloy in the chromium, cobalt, and tungsten range, with hardnesses varying from 38-58 Rockwell C scale "as cast," are now being supplied by the Delloy Metal Corp., Erie Ave. at "K" St., Philadelphia, Pa. Commercial tolerances run to plus or minus 0.005 inch. On certain small applications, these can be held to plus or minus 0.002 inch. Net weight per casting varies from 1 oz. to 3 pounds.

According to the manufacturer, Delloy Precision Castings have an extremely high resistance to heat, corrosion, abrasion, or a combination of these factors, and provide for the elimination of heat treating, reduce subsequent machining and grinding to a minimum, or, in some cases, eliminate these operations.

Modern Collet Shock-Absorbing Feed Tube

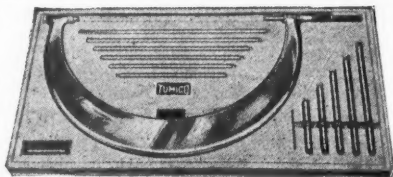
The Modern Collet and Machine Co., 401 Salliotte St., Ecorse 18, Mich., announces a shock-absorbing feed tube for Brown & Sharpe automatics of all sizes and models which do not have spring

BOW MICROMETERS

INTERCHANGEABLE MANDREL TYPE

COMPLETE SETS WITH MANDRELS AND STANDARDS IN CASES

When equipped with a set of 6 mandrels each Tubular Micrometer is in reality Six-Micrometers-in-One because each mandrel in the set of six is precision-fitted to the Micrometer with which it is furnished and is instantly accurate and ready for operation upon insertion in micrometer frame.



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1A	$\frac{1}{2}$ " to 1"	9"
2A	1" to 1 $\frac{1}{2}$ "	11"
3A	1 $\frac{1}{2}$ " to 2"	12 $\frac{1}{2}$ "
4A	2" to 3"	20 $\frac{1}{2}$ "
5A	3" to 4"	21"

TYPE B—STRAIGHT JAW DESIGN

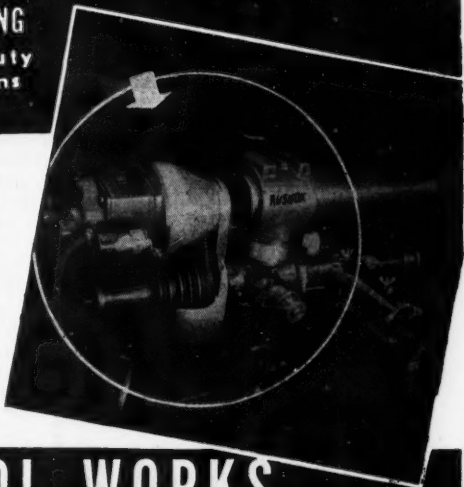
Size No.	Range of Bores Taken	Length Overall
1X	$\frac{1}{2}$ " to 1"	5"
2X	1" to 2 $\frac{1}{32}$ "	6"
3X	2 $\frac{1}{32}$ " to $\frac{3}{4}$ "	6"
00	$\frac{3}{4}$ " to 1"	8 $\frac{1}{4}$ "
0	1" to 1 $\frac{1}{4}$ "	8 $\frac{1}{4}$ "
1	1 $\frac{1}{4}$ " to 1 $\frac{3}{4}$ "	9"
2	1 $\frac{3}{4}$ " to 2"	11 $\frac{1}{4}$ "
3	2" to 2 $\frac{1}{2}$ "	13 $\frac{1}{4}$ "
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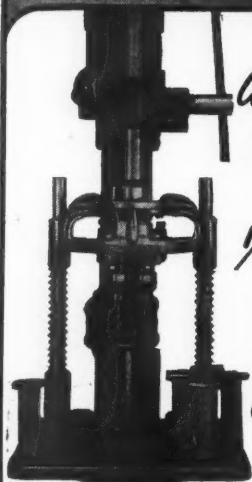
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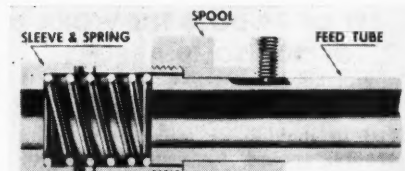
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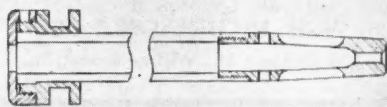
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safety devices incorporated in their feed-
ing mechanisms.

With the feed tube, forward move-
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pression spring. According to the manu-
facturer, this spring permits normal feed
without deflecting, however, in case of
interference with the advance of the feed
tube, the spring compresses and the
spool slides forward freely on the tube,
thus preventing breakage of the feeding



OUTER END OF MODERN SHOCK-ABSORBING FEED TUBE



REGULAR B & S FEED TUBE

Cutaway View of Modern Collet Shock-
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mechanism or damage to the feed tube.
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full advance of the stock itself, such as
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leasing action takes place, thereby elim-
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sary, the light brackets can be removed

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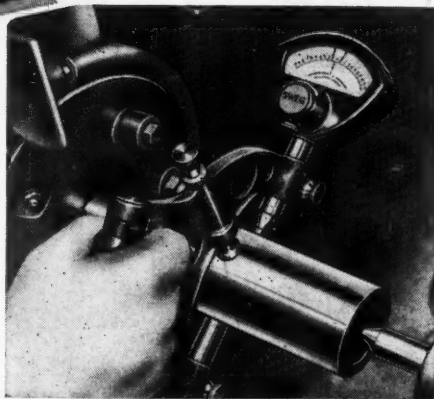
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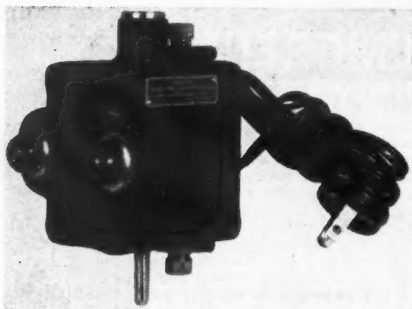
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and placed in a panel which then allows a total width of head of $\frac{3}{8}$ inch.

According to the manufacturer, the gage spindle is frictionless and contacts

vided for locking the setting. The complete unit measures approximately 2 $\frac{3}{4}$ inches square and is of simple and sturdy construction.



Yankee "Lightronic" Gage Head

are made without any multiplication leverage through electrical gas, thus completely eliminating any tendency of contact sparking. Close adjustment of plus or minus setting is accomplished through a differential screw, and means are pro-

Schneible Velocitrap

Product of the Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich., the Schneible Velocitrap illustrated herewith is recommended for use where the contaminated air removed by a dust control system contains materials which have a recovery value or heavy or abrasive solids. The unit is arranged to salvage valuable material in a dry state for return to process and said to greatly reduce abrasive wear in dust systems and collectors and to eliminate the settling out of material in the ducts.

Placed in the intake duct ahead of the collector, the Velocitrap separates solids from the air stream by means of a slot-shaped opening in an elbow of the duct within the unit. Solid particles are expelled by centrifugal force through the slot and deposited in a hopper. A smaller shielded slot, located opposite the intake slot, readmits the air into the duct and prevents back pressure.

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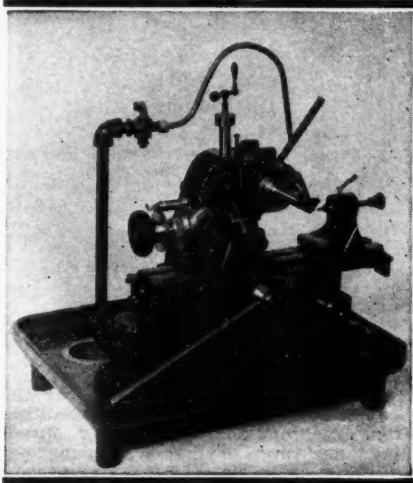
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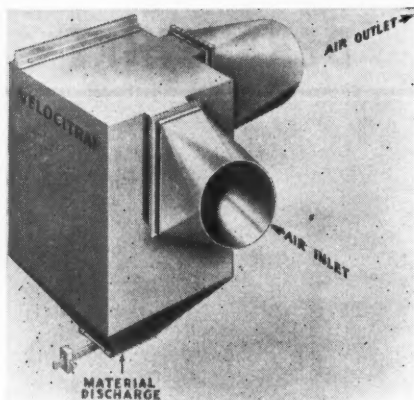
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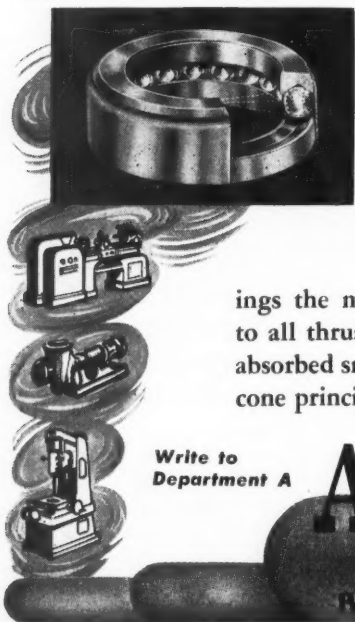
ing cleaning operations and foundry sand from downdraft shake-outs, screens, mullers, and sand conditioning systems.

The Velocitrap is made in four types for various operating conditions and in a wide range of sizes with capacities from 2,000 to 20,000 c.f.m. The unit is sturdily constructed and is adaptable to wet or dry-method dust collecting systems.

Rogers "Sixty" Shop Press

Featuring fast operation, ruggedness, versatility, and large work capacity, a 60-ton shop press to be known as the Rogers "Sixty" is announced by Rogers Hydraulic Inc., Minneapolis, Minn. Power is supplied by a two-speed hydraulic hand pump which, in high speed, moves the press ram $2\frac{1}{4}$ inches per pump stroke, providing up to 2,000 lb. pressure in fast travel. A lever on the pump may be quickly flipped to provide for high pressure operation.

The hydraulic cylinder of the unit is supported on rollers which ride the flanges of the upper bolster, and may be moved across the entire working width

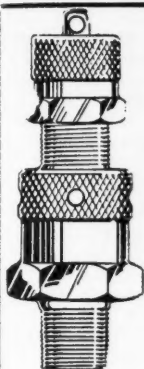


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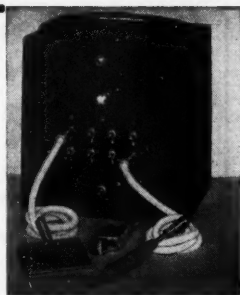
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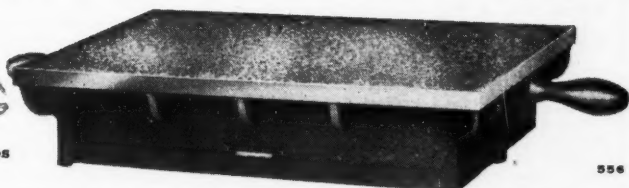
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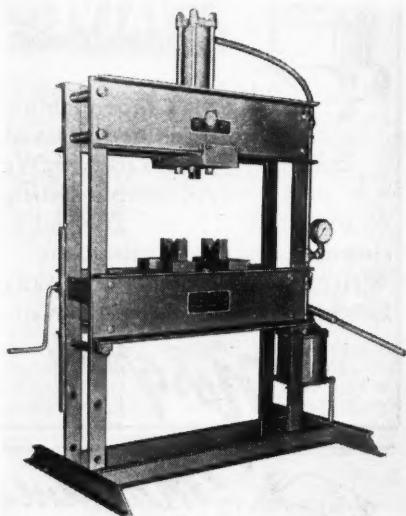
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of the press when desired. Due to the length of the cylinder, the ram travel is a full 13 inches at a continuous stroke.

Flexibility of the press is achieved through adjusting the lower bolster by means of a hand crank. The maximum opening between bolsters is 38 inches and the minimum opening is 8 inches. A



Rogers "Sixty" Shop Press

special model with an opening range of from 8 to 48 inches is available. Although the working width between the sides of the press is 45 inches, the design permits long pieces to be handled through the open sides any place above the globe valve and pump. The hydraulic pump, valve, and pressure gage (calibrated in tons and pounds) are located on the lower right side of the press for operating convenience.

Applicable to pressing, straightening, shearing, bending, clamping, riveting, broaching, and assembly work, the Rogers Sixty Shop Press is supplied complete with a machined and matched pair of V-blocks. Special attachments for ring gear riveting and for aligning and centering shafts, rods, and so on, are available, as well as an adjustable end support stand for handling long material.

Specifications of the press are as follows: overall height, 88 $\frac{3}{4}$ inches; floor space, 38 x 70 inches; inside working

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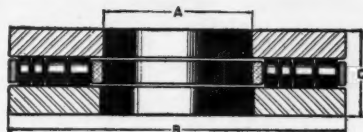


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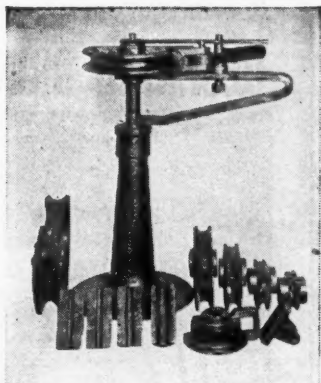
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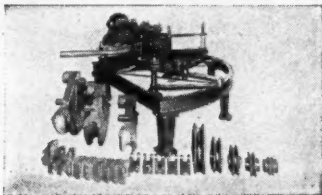
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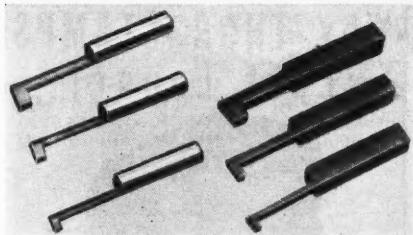


width, 45 inches; daylight between top and bottom bolsters, adjustable from 8 to 38 inches; distance between front and back bolsters, 10 inches; distance between end uprights, 8 inches; maximum capacity, 60 tons; ram travel (high speed), 2½ inches per stroke; ram travel (maximum), 13 inches; net weight, 1,125 pounds.

Star High Speed Boring Bit

The addition of a high speed boring bit to its line of Star products is announced by the Samuel S. Gelber Co., 32 S. Jefferson St., Chicago 6, Ill. The bit is precision centrifugally cast by a process which is said to assure very fine grain structure and increased tensile strength. The high tungsten content together with chrome and vanadium hardened to 64 Rockwell impart to the tool a high red hardness, excellent impact value, and unusual compressive strength, it is stated.

The Star High Speed Boring Bit is available in square and round shank sizes ranging from ¼ to ¾ inch with overall lengths of 2½ to 3 inches respectively. Hardened two-piece bushings can be



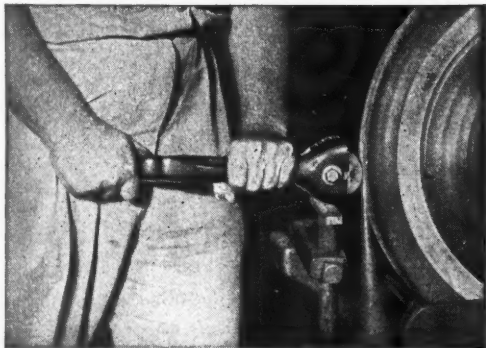
Star High Speed Boring Bits

furnished for all round shank boring bits in sizes of ¼, ⅝, ¾, or 1 inch O.D. by ¼, ⅝, or ¾ inch I.D.

"Handle-Grip" Control

According to Pneumatics, Inc., Plymouth, Ind., the newest member of its ½-inch four-way control series is the "Handle-Grip" Control illustrated herewith. Provided with full, unrestricted ports and exceedingly fast in operation, the control contains a detention spring which permits it to be fixed in either

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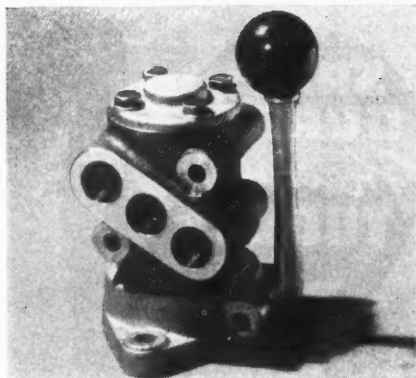


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"Handle-Grip" Control

position. Unusually compact, the valve is slightly over 5 inches high x 4 inches deep x 3 inches wide.

Other controls besides the Handle-Grip, manufactured with the same body, include cam, palm, foot, pilot, and solenoid valves.

Aeroil "Midget-6" Plast-O-Dip Tank

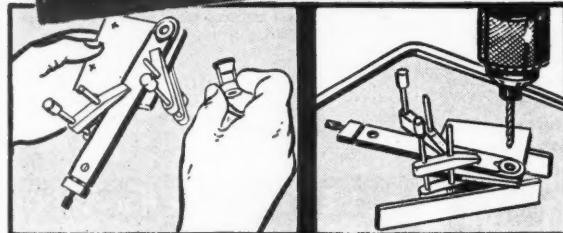
Known as the Aeroil "Midget-6" Plast-O-Dip, a portable plastic coating melting tank of one-gallon capacity specially designed for the protective coating of plugs, gages, carbide-tipped tools, and so on, has been brought out by the Aeroil Products Co., West New York, N. J. An outstanding advantage claimed for the unit is the fact that the full compound "load" can be brought to dipping temperature from a cold start in a matter of minutes, thus greatly reducing heat-up time delays.

The Aeroil Midget-6 Plast-O-Dip Tank features a one-piece inner vat of heavy warp-proof cast aluminum of high heat conductivity which is said to result in complete uniformity in heating plastic coatings. Additional features of the unit include thermostatic controls for automatically maintaining the heat at the required temperature; removable cover with insulated plastic knob handle; neon pilot light for swift visual check; and handy carrying handle for ease in portability.

The Aeroil Midget-6 weighs 16½ lb. complete and is equipped with 1,000-watt

DRILL HOLES within .001 ACCURACY

\$34⁰⁰ POSTPAID



MASTER OPTICAL

CENTER-LOCATOR

QUICK! ACCURATE! Machinists who use the Center-Locator claim that it is the simplest, speediest, most accurate method of locating centers and drilling holes on the market. It actually makes a drill press do the work of a jig boring machine! Drill jigs, piercing dies, molds, templates, metal patterns and machine parts demand an accurate relationship between a series of holes—as well as close tolerances between the centers of these holes and other points. The Center-Locator, with its powerful magnifier, performs this function quickly and accurately. *How it operates:* Lay out work with height gauge, locate center through the magnifier—then replace magnifier with any of 16 drill bushings furnished. Ask your mill supply house, or \$34.00 postpaid.

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J & S Radii & Angle Dressers in the "Fluid-Motion" series are among the finest precision dressing instruments procurable . . . regardless of cost. There is a standard model to fit most form-dressing requirements.

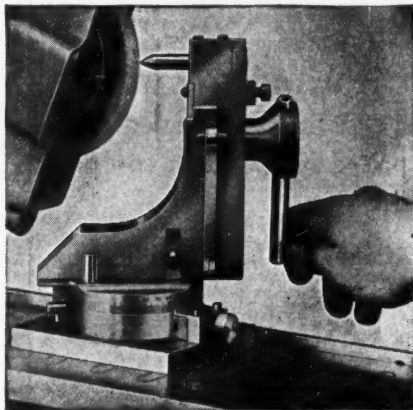
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.0001" accuracy
Automatic centering
7" & 14" wheel capacities
Large range yet compact
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More Wheel Truings Per Dollar!

The real value in a diamond is determined by the number of truings obtained per dollar invested.



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Boston 16, Mass.

elements which are connected by a standard two-prong plug. Since the total current requirements are equivalent

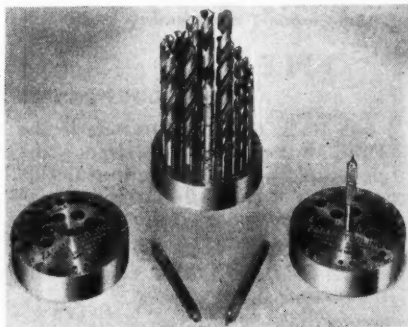


Aerofil "Midget-6" Plast-O-Dip Tank in Use

to that of an ordinary domestic iron, no special fuses or wiring is necessary in using the tank, it is claimed.

Zagar Drill Stand

A drill stand which is designed to accommodate 32 drills from $\frac{1}{16}$ to $\frac{1}{2}$ inch inclusive in multiples of $\frac{1}{16}$ inch is now



Zagar Drill Stands and Scribers

being introduced by Zagar Tool Inc., 23880 Lakeland Blvd., Cleveland 17, Ohio.

Accurately machined with the aid of two standard Zagar multiple-spindle drill heads, the stand can be obtained

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Two Spindle Head
Both Spindles
Adjustable
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LUCIFER

**Electric Heat Treating Furnaces with
Automatic Electric Control**

PRICE \$188.00, F.O.B. PHILADELPHIA.

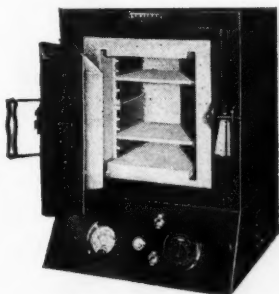
Heat treat small parts in your own plant economically. Ideal for hardening, drawing, tempering and annealing or normalizing of fine punches, gages and fixture parts. In fact—anything that will fit within our range of muffle sizes from 5½" x 5½" x 6" to 12" x 12" x 10". The Automatic Heat Control permits you to maintain any predetermined temperature within its heat range up to 2000 F. Comes equipped with pyrometer, thermo-couple, pilot light and control switches. Write for our booklet.

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Distributors: New York-Connecticut: Lafayette Tool & Supply Co., 128 Lafayette St., New York 13, N. Y. Rhode Island-Massachusetts: H. Leach Machinery Co., 387 Charles St., Providence 4; R. I. California: Reagan Company, 6409 Santa Fe Ave., Huntington Park, Calif. Minnesota: Satterlee Company, 118 Washington St. North, Minneapolis 1, Minn. Eastern Pennsylvania-Southern New Jersey: Wilson Steel & Tool Co., Commercial Trust Bldg., Philadelphia 2, Pa.



Interior size No. 7053 8" x 8" x 10", exterior size 18" x 20" x 24". Operation 110-V. A.C. or 220-V. A.C., rating 3 K.W. Shipping weight approximately 225 lbs. Operating cost approximately 6c to 8c per hour.

separately or complete with high speed drills and a toolmaker's scriber of the type shown in the accompanying illustration.

Comal Gage

Designed for use in checking bores of $\frac{1}{2}$ -inch diameter and up, as well as deep and shallow holes, a gage which is calibrated in thousandths, parts of thousandths, or "tenths" and has a total measuring range of 0.012 inch is now being manufactured by the Comal Gage and Machine Co., 2819 Jay Ave., Cleveland 13, Ohio. According to the manufacturer, a constant rise radius part provides a complete parallel contact with high and low points throughout the gag-

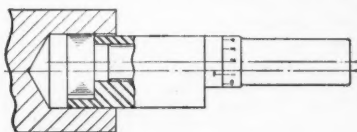


Comal Gage

ing range of inside bore diameters. Rotation of the knurled handle instantly provides calibrated readings to indicate

over or undersize, out-of-round, or taper conditions, each condition being checked without removing the gage from the hole.

Made of high grade tool steel with all wearing parts hardened and precision ground and lapped, the Comal Gage is claimed to permit inexperienced opera-

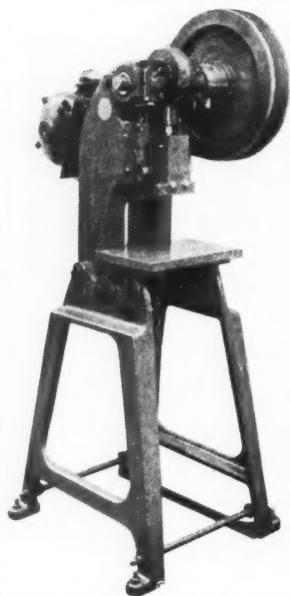


Cross-sectional drawing of Comal Gage

tors to achieve indicator precision gaging of inside diameters without "feeling" or "rocking" and without the use of a separate indicator or master gages. The gage is available in four styles.

Hebard "Shop Mule"

Manufactured by the W. F. Hebard Co., Chicago, Ill., the "Shop Mule" illustrated herewith comprises a completely



15 TON PRESS READY FOR DELIVERY

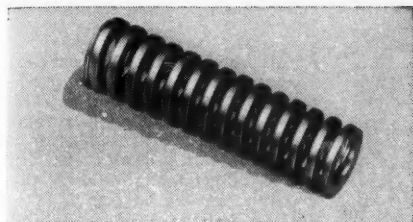
\$450 F.O.B. HARTFORD, LESS MOTOR

Crankshaft bearings— $1\frac{1}{2}$ " x $3\frac{3}{4}$ " bronze. $3\frac{3}{4}$ " x $3\frac{3}{4}$ " bronze. Stroke— $1\frac{1}{2}$ ". Die space stroke down—6", up—8". Adjustment of slide— $1\frac{1}{2}$ ". Size of hole for punch— $1\frac{1}{2}$ ". Ram face—L to R—6", F to B—4". 850 r.p.m. motor recommended. Floor space—22" x 24". Height from floor to center of shaft—51". Approximate weight—1,000 lbs. Bed: size of oblong opening in knee— $5\frac{1}{2}$ " x 7", opening in back— $5\frac{1}{4}$ " x 6". Ram center to frame— $5\frac{1}{4}$ ". Distance from gibs to bed— $8\frac{1}{2}$ ". Bolster plate— $9\frac{1}{4}$ " x 14" x 1". Flywheel weight diameter—20" x 14", width—3". Pressure at bottom of ram—15 ton. Don't delay—write today.

Wm. Brewer Machine Co.

75 Laurel St.

Hartford, Conn.



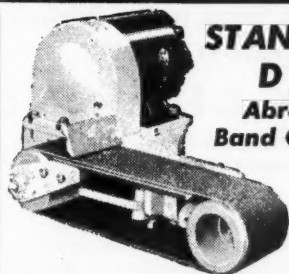
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HIGH DEFLECTION
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MEDIUM DEFLECTION

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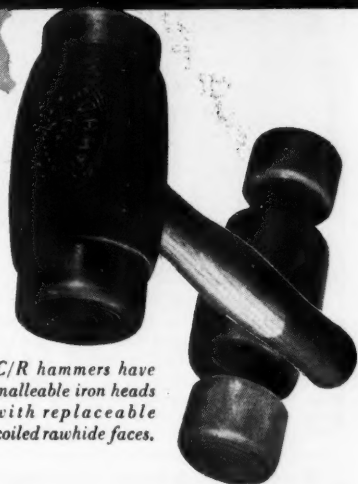
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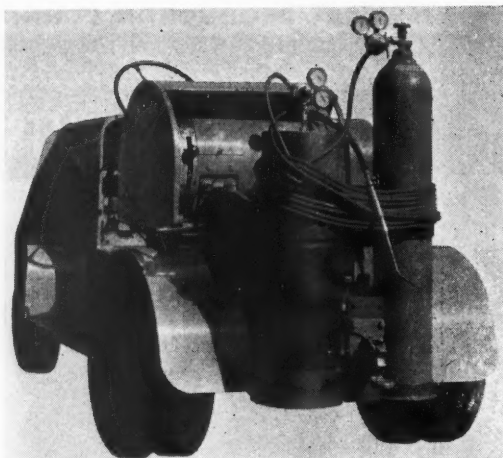


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When hammers and mallets must take stern punishment in long, hard service . . . when they must give forceful blows with maximum protection to fine finishes and expensive machined parts . . . it will pay you to insist on *Chicago Rawhide*. Made from tough, resilient, carefully selected hides, C/R hammers and mallets won't crumble, split, mushroom or erase, and they hold their true striking surfaces. Rawhide protects . . . Chicago Rawhide protects most.

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Hebard "Shop Mule"

a roll hood behind the driver's seat and is followed by racks for oxyacetylene tanks. This convenient grouping is intended to save the operator time in employing the equipment and provides for unusually fast welding.

"Tru-Torque" Screw Driver

Known as the "Tru-Torque," a torque measuring and controlling screw driver of the friction-disc type is announced by Airdraulics Engineering, Inc., New Canaan, Conn. Light in weight, the tool is manufactured in three standard sizes of from 0 to 6 inch torque pounds, 0 to 12 inch torque pounds, and 0 to 25 inch torque pounds.

The Tru-Torque Screw Driver is designed for continuous precision service on production and assembly lines and for

self-contained welding service unit for railroad and industrial use.

The unit includes a P&H arc welding generator and oxyacetylene equipment. The welding generator, with a capacity from 30 to 375 amperes, is mounted under

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IN HUNDREDS OF PLANTS—PROVE THEIR EFFICIENCY**

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**PRECISION DRILL GRINDERS FOR SMALL
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It's a waste of money to use skilled labor for grinding small drills—because any unskilled laborer with a single Black Diamond machine, can produce quantities of precision ground, true centered drills with—lips of uniform length—correct angle and proper clearance. And the Web Thinning attachment cares for Notched—Colton or Crank Shaft Points just as efficiently.

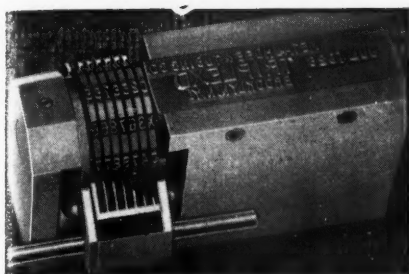
If you use quantities of small drills, singly or in gangs—you can save valuable production time, labor and money by installing a Black Diamond Drill Grinder at once.

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COMBINATION AUTOMATIC NUMBERING HEADS AND MARKING DIES

For automatic serial numbering and marking, it cuts costs by eliminating dual operation.

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**MARK IT BEST WITH
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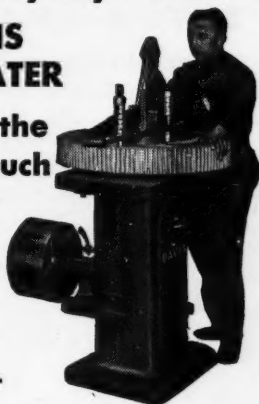
The Noble & Westbrook
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Why Use A Shaper to cut Keyways when a

DAVIS KEYSEATER

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job so much
quicker
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better?

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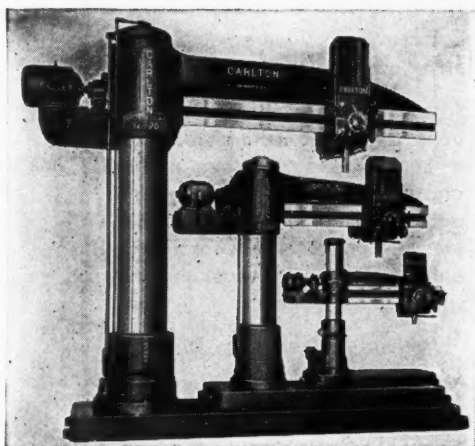
Features:

1. All ball-bearing throughout
2. Low-Hung Drive to Spindle
3. Quiet running at all speeds
4. Requires oiling only every six months
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6. Constructed on unit principle

MADE IN SIZES OF

7. 3 feet to 12 feet inclusive arm lengths
8. 9 inch to 26 inch column diameters.

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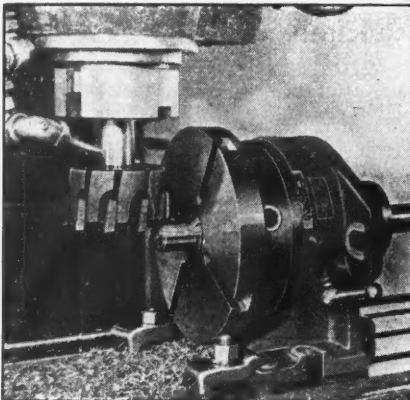


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CINCINNATI 25, OHIO, U. S. A.

The Hartford

"SUPER-SPACER"

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JIG BORING
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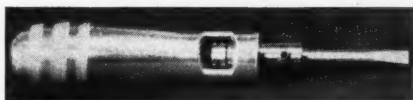
The HARTFORD "Super - Spacer" has proved its wide possibilities to many users.

Assures accurate machining operations and rigid control on your milling, drilling, grinding, slotting and jig boring. It is simple, compact and rugged in design, operates at speeds and feeds limited only by the capacity of the machine.

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HARTFORD 5, CONN.**

maintenance work. To use, the screw driver is preset at the desired torque and the operator tightens the screw, nut, or bolt. When the predetermined torque



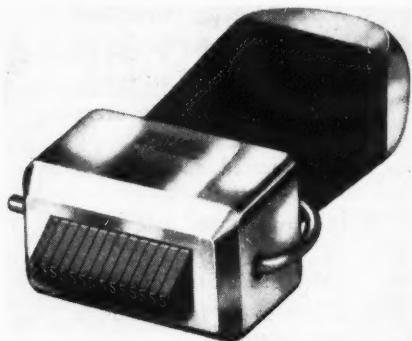
"Tru-Torque" Screw Driver

is reached, the handle of the tool slips and no further tightening of the screw is possible.

The Tru-Torque Screw Driver is supplied complete with one regular blade for slotted screw, nuts, or bolts; one Phillips type blade; one Allen wrench and pin setter. A snap-on type adapter is also available.

Cunningham "Safety Utility" Type Holder

Featuring lightweight, thus enabling it to be conveniently carried in a coat or trouser pocket, the "Safety Utility" Type Holder now being offered by the M. E. Cunningham Co., 158 Carson St., Pittsburgh 19, Pa., is especially adapted to the stamping of brand names, lot numbers, and serial numbers on etched plates,



Cunningham "Safety Utility" Type Holder

keys, silverware, tools, checks, tags, and machine parts, as well as for the stamping of stock numbers on metal bars and sheets.

The holder is available in nine sizes with type recesses ranging from $\frac{1}{2}$ to $1\frac{1}{2}$

SIMPLE — FAST — ACCURATE LOCATING



SIMPLE

Place instrument in spindle of boring mill (vertical or horizontal), drill press or jig borer.

FAST

200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

ACCURATE

Locate cross lines on work to match lines in viewing aperture.

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CENTER SCOPE PRODUCTS

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LUMA

Patented



Combination Demagnetizer and Electric Etching Pencil. Masks symbols in hardest steel. Demagnetizes instantly. One of our models popular in tool rooms for 15 years.

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WHITNEY-JENSEN PRODUCTS

30 YEARS EXPERIENCE

Nos. 16 and 17

BENCH PUNCHES

No. 16

No. 17

Capacity $\frac{3}{8}$ " thru $\frac{1}{4}$ " $\frac{1}{4}$ " thru $\frac{1}{4}$ "

Depth of

Throat $3\frac{1}{2}$ " $6\frac{1}{2}$ "

The No. 16 and No. 17 Bench Punches are powerful, easy to operate, with smooth, roller bearing action.



WHITNEY METAL TOOL COMPANY

110 FORBES ST. • ROCKFORD ILL.

inches in length. The choice of recess depends upon the desired number of characters to be marked. The nine sizes of type characters can be used in any size holder.

The Cunningham Safety Utility Type Holder is made of patented "Safety" steel which is said to eliminate spalling and mushrooming. The Wedge Grip feature incorporated in the holder is said to assure the operator a firm grip, thus preventing the holder from slipping during stamping regardless of greasy fingers or holders. The sturdy steel type is held firmly in place by a special locking pin of spring steel which allows for quick and easy type changing.

Cyclone Drill Bit

The New England Carbide Tool Co., 60 Brookline St., Cambridge, Mass., announces a carbide-tipped drill bit designed for drilling holes in concrete, cement, brick, tile, marble, and other forms of masonry material. The bit, which is designated as the Cyclone, can be readily used in an ordinary rotary electric drill.

Designed to remain sharp over an unusually long period of use as a result of



Cyclone Drill Bit in Use

the carbide tip, the Cyclone Drill Bit, in addition to use in masonry material, can be used for drilling chilled iron and cor-rod holes in aluminum, cast iron, and

Faster
SET-UPS...!



In tapping and reaming, the Ziegler Holder greatly reduces set-up time because it automatically compensates for inaccuracies in spindle alignment up to 1/32" radius or 1/16" diameter.

It also aids materially in reducing spoilage losses, turning out work to the finest of tolerances even when the spindle is not in perfect alignment with the work.

W. M. ZIEGLER TOOL CO.
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FLOATING HOLDER
for Taps and Reamers...

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**AUTO MOULDING
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WIRE ROPE CUTTER No. C

Hand Operated.

Price: \$93.84. Weight 110 lbs.
Lever Action.

Made in two capacities:
One for 1" and smaller wire
rope. One for 1 1/4" and
smaller wire rope.

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Prices
of popu-
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REMOVES BROKEN TAPS!

Gets them out fast.
No damage to
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Simple and easy to
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High Speed COUNTERBORES

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.. and duplicate them at will!



The precision
optical protractor for measuring
exact angles on cutting tool edges.

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without removing from machine
or grinder.

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DEPT. M, 351 S. LA BREA AVE.,
LOS ANGELES 36, CALIF.

MANUFACTURERS OF OPTI-TOOLS

other styles of non-ferrous materials. The bit is made in sizes ranging from $\frac{1}{8}$ up to and including $1\frac{1}{2}$ inches in diameter in increments of $\frac{1}{8}$ inch.

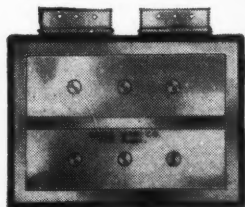
Eriez Non-Electric Stainless Steel Magnet

The development of a powerful, compact, non-electric magnetic separator with a working surface made entirely of stainless steel is announced by the Eriez Manufacturing Co., Erie, Pa. The magnet can be installed in all types of machines requiring magnetic protection and is available in any size to fit existing or new conveying equipment. It is constructed of powerful magnetic Alnico alloy under General Electric patents.

According to the manufacturer, many Eriez Magnets are being installed ahead of dies to eliminate the danger of pieces of metal passing into the dies, seriously damaging or destroying them. In addition, the unit is said to offer a simple and efficient means of removing both large and small pieces of iron and steel trash from ingredients going into the manufacture of lime, cement, oils, fats, paints

and varnishes, rubber, petroleum, soap, and so on.

The accompanying illustration shows the edge strips and center insulating strip of non-magnetic stainless steel to prevent the strength of the unit from magnetizing the steel on which it is



Eriez Non-Electrical Stainless Steel Magnet

mounted. The two "pulling" areas on each side of the center insulating strip are made of magnetic stainless steel.

The Eriez Magnet requires no wiring, power being furnished by the Alnico steel magnet castings. The magnet is so made that its strength is claimed to last indefinitely.



Ideal all-purpose shop box. Sturdy all-welded construction. Heavy skids act as positive stacking lock and reinforce box at point of maximum wear. Other sizes and styles available.

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BAY INC. 3015 No. 16th St., PHILA. 32, PA.
Bell Telephone: Baldwin 9-1805

STEEL STACKING BOXES

Prompt Shipment

Any Quantity

**STYLE 600
STACKING BOX**

10" x 16" x 5 $\frac{3}{8}$ "

\$1.11 Ea.

F.O.B. Factory

Stacks with No. 601

12" x 18" x 6 $\frac{7}{8}$ "

\$1.43 Ea.

Stacks with No. 602
F.O.B. Factory

**MOGUL
CAST-SEAL**

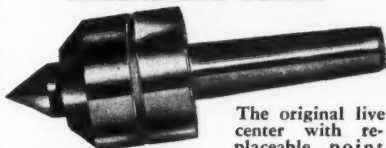
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in CASTINGS
FAST AT LOW COST**

If porous castings are your problem Mogul Cast-Seal is the solution. Used in hundreds of plants from coast-to-coast.

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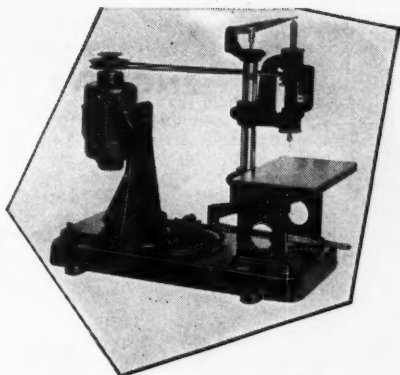
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KOEBEL

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Get Accurate SMALL HOLE DRILLING FASTER . . . with the L & D Micro-Drill Press

The Lord & Davis Micro-Drill Press gives you accurate small hole drilling004" to 1/16" . . . faster and at lower cost because it has perfect operating control at high speeds.

Supersensitive Control. The floating spindle has supersensitive control. It operates with very slight pressure . . . feeding the drill at the correct rate. This positive, simple-to-use feature reduces drill breakage, cuts down work spoilage, and insures greater output at lower cost.

New Adjustable Bearings. The spindle floats in split-type bronze bearings, both top and bottom. These new bearings give proper running clearance, reduce vibration, assure true running spindle, and give you exceptional accuracy. They can be adjusted for wear to give longer life.

Uses Pin or Jacobs Chucks. A Derbyshire Pin Chuck is standard equipment; Jacobs Chucks may be used with an adapter.

Drill accurate small holes faster, at lower cost, with L&D Micro-Drill Press. Send for folder today.

MASSASOIT MACHINE COMPANY

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ENGRAVE
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**NEW
HERMES
PORTABLE**

The handy, accurate machine that every plant
NEEDS for speedy production lettering of name
plates, small panels, novelties, serial numbers,
part numbers, etc.

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13-19 University Place • New York 3, N. Y.
West Coast Rep. - WIGGEE & DORRER, 315 West 5th St., Los Angeles 13, Calif.

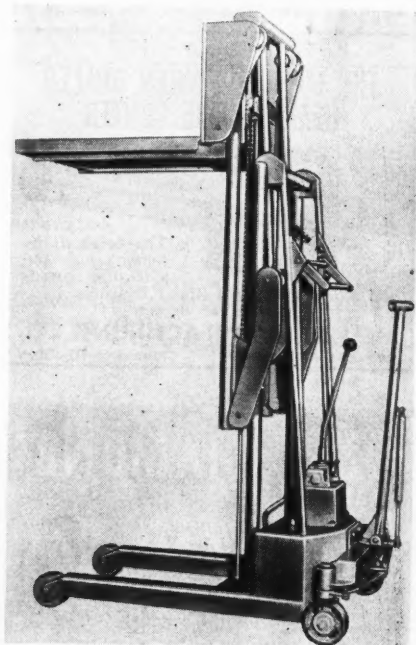
**GAMMONS
REAMERS**

Manufacturers of
The Gammons Helical Taper Pin Reamer
The Gammons Helical Chucking Reamer
The Gammons Helical Die Making Reamer
The Gammons Duplex Taper Pin Reamer
Special reaming problems invited
Send for Catalog

THE GAMMONS-HOAGLUND CO.
MANCHESTER CONNECTICUT

**Telescopic Frame for Lyon-
Raymond Hydraulic
High-Lift Truck**

To make its hydraulic high-lift truck
adaptable to higher stacking and tiering
jobs, the Lyon-Raymond Corp., 2735
Madison St., Greene, N. Y., has designed
a telescopic frame which increases the
elevated height of the platform to 84



**Lyon-Raymond Hydraulic High-Lift Truck
with Telescopic Frame**

inches. (The standard elevated height
without the telescopic frame is 48
inches.) In the lowered position, the
overall height of the unit is maintained
at 69 inches, thus allowing the truck to
be moved through doorways and under
overhead obstructions.

The telescopic section is of the same
tubular construction as the base frame,
thus assuring that added weight is kept
to a minimum. An auto-type steer, with
wide-spread front wheels, is provided for
increased stability.

Although the accompanying illustration
shows the truck equipped with a hand

pump, a motor-driven pump is also available and is particularly recommended for any operation involving frequent elevation of the truck platform.

Nopco Cutting Oil Bases

Three cutting oil bases for use in the metal-working trades, including a unique, extreme pressure cutting oil base known as Nopco 1009-C, in which sulphur and chlorine are combined in non-corrosive form, have been developed by the National Oil Products Co., Harrison, N. J. Recommended for steel, brass, and copper cutting operations in which frictional loads are extremely high, Nopco 1009-C is a specially prepared fatty oil base containing a high content of equal parts of sulphur and chlorine. Absolutely odorless and free from tarry matter, it blends in all proportions with any diluent petroleum oil down to required viscosity, sulphur, and chlorine specifications.

A powerful, sulphurized cutting oil base, known as Nopco 1009-A, and a soluble cutting oil base designated as Nopco 2009-A, complete the series of three recently developed bases. The former contains 15 per cent sulphur in both chemical combination and active form, and is recommended for straight cutting operations on ferrous metal. It is used commercially by dilution or blending with low viscosity mineral oil in which this base is completely soluble. Such blends may contain anywhere from 1 per cent to 10 per cent of total sulphur, depending on the type of cutting to be done.

According to the manufacturer, Nopco 1009-A is absolute free of tarry matter and pitches due to the carefully controlled conditions used in manufacturing the product as evidenced by the clear, transparent color. This quality is also said

to result in the product being free of acid by-products which may be the cause of later rusting of the workpieces.

An outstanding quality of Nopco 2009-A, the soluble cutting oil base, is the great stability or permanency of the emulsion formed by diluting the mineral oil base blends with water. The mixture possesses strong detergent properties, yet liberates no free alkali or chemicals injurious to plant operations, it is claimed.

Mineral oil blends of Nopco 2009-A are recommended for use where thorough and rapid removal of frictional heat developed under high loads in cutting opera-



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

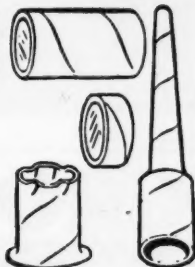
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.



Every Fine Little Unit DESERVES this PROTECTION!

PRECISION Dust Caps and Thread Protectors



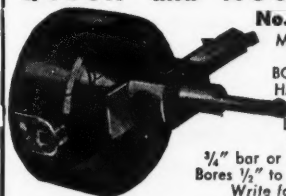
In storage or transit. Save hunting for makeshifts. Protection inside and out, from rust, dust, grit, moisture and rough handling. For all shapes. Economically priced. Send for samples.

PRECISION PAPER TUBE CO.

2051 W. Charleston St.

Chicago 47, Ill.

QUICK and ACCURATE



No. 35 FLYNN

MICROMETER
OFFSET
BORING HEAD
HAS RIGIDITY
PLUS A
Large Range
2" OFFSET

$\frac{3}{8}$ " bar or tool capacity.
Bores $\frac{1}{2}$ " to 12" dia. holes.
Write for catalog.

FLYNN MANUFACTURING CO.

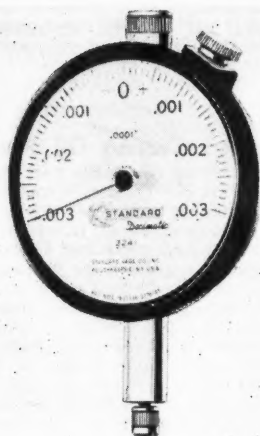
437 Bates St.

Detroit, Mich.

tions is required. It can also be used for grinding, broaching, polishing, and similar metal-working operations where strong detergent properties are required in order to rapidly remove metallic dust or particles from the grinding wheel.

Standard Decimatic Indicator


For fine tolerance checking, an indicator designated as the Decimatic has been introduced by the Standard Gage Co., Inc., Poughkeepsie, N. Y. The indicator features dial marks in decimals, directly comparable to blueprint tolerances.



Standard Decimatic Indicator


Working advantages of the indicator include the modified range from approximately "20 minutes of" to "20 minutes past" on the dial. This range, while adequate for all but coarse tolerance checking, is said to eliminate the possibility of failure to notice a complete revolution of the hand. In addition, the gage is claimed to be free from noticeable whip and waver of the hand, with consequent reduced nervous strain on the operator.

Mounting dimensions of the Standard Decimatic Indicator are in accordance with American Gage Design standards and consequently the indicator may be used in fixtures designed to accommodate AGD indicating instruments. The Decimatic Indicator is available in 19 different models with a variety of graduation values in both English and metric units.



POBCO


NON-METALLIC BEARINGS



SELF-LUBRICATING

Will outwear babbitt or bronze by margins greater than 3 to 1.

No oil drip, no hardening or glazing, variable speeds, silent operation, micrometer tolerances.



Specializing in odd-shaped bearings for intricate and precision applications.

Long life—low cost.

Prompt deliveries, quality and accuracy guaranteed.

For all machinery — for most conditions.
Write for descriptive circular.
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**5000 SHAPES AND SIZES
GROBET SWISS FILES**

Genuine Grobet Precision Swiss Files are world famous for utmost precision and durability since 1812. Learn more about these chrome steel files—send for Catalog KF, the most complete of its kind.

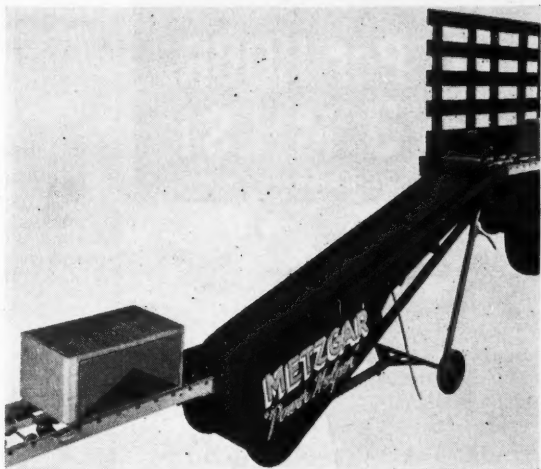
GROBET FILE CO. OF AMERICA
421 Canal St. • New York 13, N. Y.

Metzgar "Power Helper"

Metzgar "Power Helper"

Quickly adjustable from a horizontal 18-inch high position to an angle of 45 degrees and suspended by heavy compression springs and ball bearing rubber-tired wheels, a conveyor with automatic belt tensioning feature that provides for unusually long belt life since tension is applied only when necessary, to be known as the Metzgar "Power Helper," is now being introduced by the Metzgar Co., Grand Rapids, Mich. The unit can be equipped with either a cleated belt or a rubber grip-top belt which can be tracked to any part of the slider boards proper and is said to remain as adjusted.

The Metzgar Power Helper has a variable belt speed of 40 to 50 feet per minute. The basic unit has a 6-foot exposed belt



surface, however, the length can be increased in multiples of 1 foot up to 10 feet. According to the manufacturer, the operating pitch of the unit in no way affects the efficiency of the lubrication



DOWEL PINS



Immediate Delivery!

Standard Size Dowel Pins from $\frac{1}{8}$ " to 1" diameter and from $\frac{3}{8}$ " to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N. J.

GRANT

RIVETERS



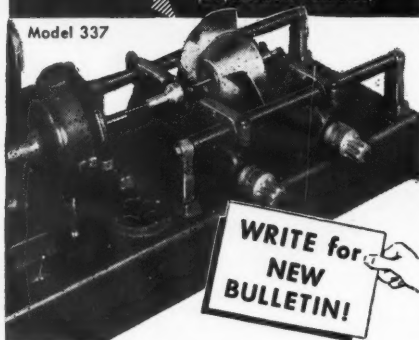
• Pioneers in the riveting field. Head rivets from smallest to $\frac{1}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 5, Conn.

**20 Per HOUR
to 3 MILS!**

(Displacement Tolerance)

Model 337



How One Manufacturer Profits by BEAR DY-NAMIC BALANCING

Reports the Dynamic Air Engineering Co. of Los Angeles: "Bear eliminates the 'Wobblies' of un-balance in high speed axial flow propellers faster than 20 per hour to a 3 mil displacement tolerance." Here, as always, the Bear machine is so small in size, and so quick, that the operation fits readily into production.

Any shop hand can learn Bear-Balancing in less than a day. Every Bear machine is widely adaptable within its range. Each balances bodies to the recognized standards. All are very reasonably priced. Write for new literature ... chase the "Wobblies," of dy-namic and static un-balance ... improve both product and sales! BEAR MFG. CO., Industrial Div., Dept. MTBB, Rock Island, Ill.



BEAR

COMBINATION

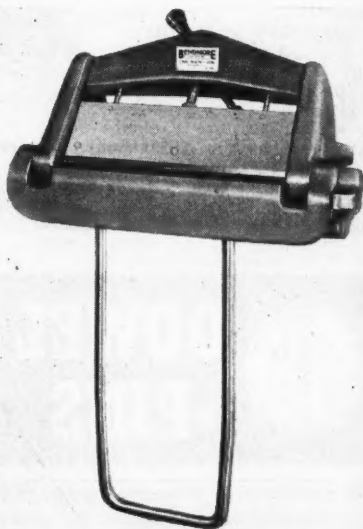
STATIC AND DY-NAMIC BALANCING MACHINES

4874

system. For safety and appearance, movable parts of the conveyor are completely enclosed behind steel covers.

"Bendmore" Hand Brake

Designed to handle material up to a full 12 inches in width with a thickness of from that of paper up to 3/32 inch, a hand brake to be known as the "Bendmore" has been developed by Carl Wirth & Son, 1625 Clinton Ave., N., Rochester, 5, N. Y. An outstanding feature of the machine is the work-holding head which moves so as to compensate for the vari-

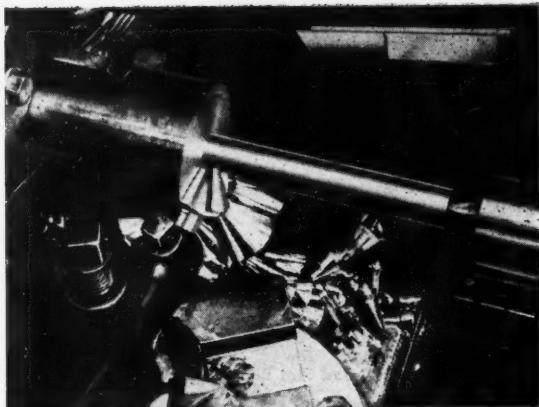


"Bendmore" Hand Brake

ous gauges of metal handled, thus eliminating all adjustment. Bends up to 135 degrees can be made with a stop that is adjustable for the full range. Two stops are provided for length of one leg, for duplicating and precision bending.

According to the manufacturer, the Bendmore Hand Brake is rigidly constructed and provides for the production of clean bends throughout the full capacity. In use, the operator merely inserts the stock up to the required stop, pulls the cam head lever and completes the bend. The weight of the unit is approximately 100 pounds.

"Shearcutter" $\frac{3}{8}$ -Inch Tool Bit
taking a $1\frac{1}{8}$ -inch cut under normal
power feed in cold rolled
steel



"Shearcutter" Tool Bit

Designed to cut metal with a knife-like action, a tool bit utilizing the principle of molecular cleavage, to be known as the "Shearcutter," is announced by the Fearless Tool Co., 1234 S. Gramercy Place, Los Angeles 6, Calif. Standard in size, the tool bit embodies a scientifically pre-sharpened cutting edge and chip pressure channel which are said to allow for depth of cuts up to three times the nominal size of the tool bit used.

The Shearcutter Tool Bit may be used on copper, brass, bronze, plastics, cast iron, steel, and other ferrous and non-ferrous alloys without changing the original grind and is made to fit a standard toolholder.

J & L Ground Thread Flat Rolling Dies

The Jones & Lamson Machine Co., Springfield, Vt., announces the introduction of ground thread flat rolling dies for use on Waterbury Farrel, Manville, National Bolt Maker, and National Elec-

Plants:
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Grobet

ROTARY FILES

HAND CUT • MILLED CUT GROUND FROM THE SOLID

There is a Grobet Rotary File, Cutter, Die-sinkers' Bur in shape, size, and coarseness of cut for every type of hard or soft metal, plastic, wood, etc.

Send for Catalog KR illustrating the complete line in full size, speed charts, etc.

GROBET FILE CO. of AMERICA

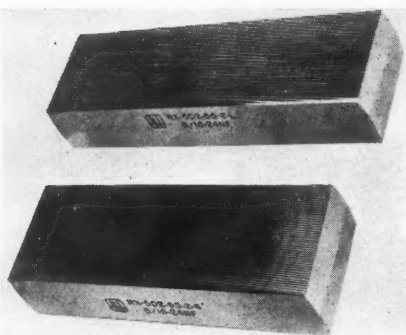
421 Canal Street



New York, N. Y.

IMPORTERS OF GROBET SWISS FILES

MAKERS OF GROBET ROTARY FILES



J & L Ground Thread Flat Rolling Dies

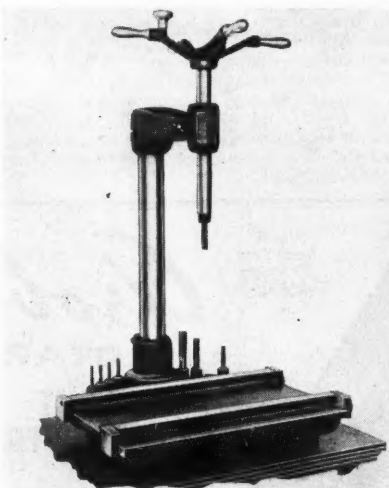
tric Jr. and Sr. thread rolling machines. The dies have a maximum length equivalent to No. 40 Waterbury Farrel or 10 inches and can be supplied in any widths up to 8 inches. The short die has a standard type of starting and leaving end which, together with the thread form, is ground into the die in one operation on thread grinders built especially for this kind of work. All dies are

matched and, as a result of their accuracy, even distribution of rolling pressure is said to be assured and die life increased in threading both soft and heat-treated materials.

The J & L Ground Thread Flat Rolling Dies are available in single face, duplex, and step types in all thread forms.

Viking Improved Hand Tapper

Improvements in the design of its hand tapper is announced by The Viking Tool & Machine Corp., 6 Main St., Belleville 9, N. J. Outstanding among the improvements of the unit is its unique adjustable arm which can be quickly raised or lowered and swung to the right or left, thus greatly increasing flexibility and reduc-



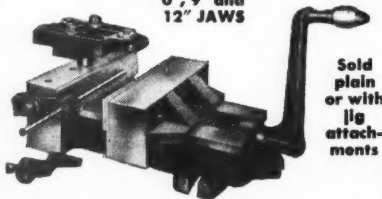
Viking Improved Hand Tapper

ing the amount of resetting. Work of any height up to 18 inches can be handled in the unit. According to the manufacturer, square alignment of the work and tap in all positions of the arm prevents tap breakage and permits the use of high speed ground thread taps.

Another important advantage of the Viking Improved Hand Tapper is the provision of two sliding parallel bars to hold the work firmly in place, thus eliminating the need for a vise. The unit makes use of adapters which are said to allow for the changing of taps in 5

GRAHAM MULTI-PURPOSE VISE

6", 9" and
12" JAWS



Sold
plain
or with
jig
attachments

Perfect as a plain vise—swell as a ready-made jig or fixture with all sorts of stops, guides, special jaws, etc. Sizes up to 124 lbs. for drill press, radial, shaper, planer, miller, grinder.



REQUEST
NEW BULLETIN 41

completely illustrating
and pricing the above
Vise and Attachments,
also our famous

"Adjust-Angle"

Knurl Holder Fitting
Lathe Turret

GRAHAM MFG. CO.

32 BRIDGE ST.

EAST GREENWICH, R. I.

seconds. Adapters are available in eight standard sizes from $\frac{1}{4}$ to $\frac{3}{8}$ inch.

Microtex Air-Dry Rack Coating

An air-dry rack coating that is said to effectively meet the requirements of all plating, anodizing, Tannerizing, Parkerizing, and Bonderizing cycles, to be known as Microtex, is announced by the Michigan Chrome and Chemical Co., 6340 E. Jefferson Ave., Detroit 7, Mich. Having essentially the same ingredients and insulating qualities as the company's Microtape and Microtube plating insulation materials, Microtex is described as tough, resilient, and flexible and is said to attain maximum adhesion without depending upon shrinkage.

A black material with a high luster, Microtex Air-Dry Rack Coating is said to be unaffected by any solution commonly used in plating and anodizing cycles, including the electrolytic sulfuric acid strip used to dissolve bright nickel, and alkaline cleaners at boiling temperatures. The material is also claimed to be very effective in minimizing dragout and may be easily and economically applied by the dip, brush, or spray method, depending on the construction of the rack.



Van Keuren No. 20-1.68C Carboloy Gear Wire Set

Van Keuren No. 20-1.68C Carboloy Gear Wire Set

Designated as the No. 20-1.68C, a set of Carboloy wires for use in measuring both external and internal gears is announced by The Van Keuren Co., 176 Waltham St., Watertown, Mass. The set includes two wires each from 7 diametral

THE "FORM - MASTER"

ANGLE and RADIUS DRESSER

A sturdy, quality instrument designed by form-grinding specialists to dress both angles and radius at low cost. Two $\frac{1}{3}$ ct. diamonds and instrument case included—\$150.00 complete.

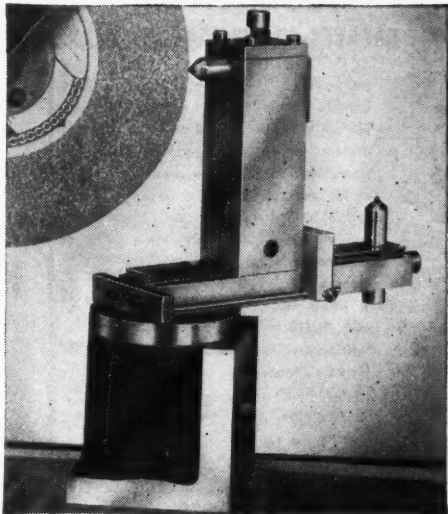
Features

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

Call your supplier or write

J. & S. TOOL CO.

477 Main St., E. Orange 5, N. J.



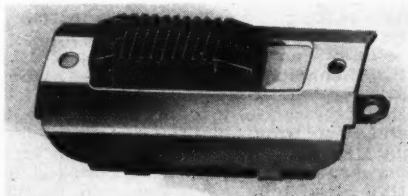
pitch (0.240 inch diameter) to 80 diametral pitch (0.021 inch diameter). As the result of their Carboloy design, the gear wires will retain their accuracy of ± 0.000025 inch for a long period of time and will not develop flat spots, gouges, or nicks, it is claimed.

The Van Keuren No. 20-1.68C Carboloy Gear Wire Set is furnished complete with a circular that includes accurate and up-to-date tables giving the measurements over wires for one diametral pitch external and internal spur gears from 5 to 500 teeth and for pressure angles of $14\frac{1}{2}$, $17\frac{1}{2}$, 20, 25, and 30 degrees. The only calculation that is said to be required is to divide the table values by the diametral pitch of the gear being measured. An additional table shows the amount that the teeth are too thick or too thin when the measurement over the wires is greater or less than standard.

Allied E-4 Snap Switch

An unusual torsional spring arrangement which is designed to assure snap action and high contact pressure is featured in the E-4 Snap Switch developed by the Allied Control Co., Inc., 2 East

End Ave., New York 21, N. Y. Other construction features of the switch include a formed steel housing and heavy laminated Bakelite base to provide structural rigidity and maximum insulation. The switch is actuated by a slide-type



Allied E-4 Snap Switch

molded Bakelite button.

The Allied E-4 Snap Switch is available as a single-pole double throw, single-pole single-throw normally open, or single-pole single-throw normally-closed type. It is rated at 300 watts a.c., 3 amperes at 115 volts a.c. $\frac{3}{4}$ ampere at 115 volts d.c. non-inductive. The switch measures $1\frac{5}{8}$ inches long x $\frac{5}{8}$ inches high x $\frac{7}{8}$ inches wide and weighs approximately $\frac{1}{2}$ ounce.

Immediate Delivery FROM STOCK

GREAVES-SILENT BAKELITE GEARS



No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads... their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time... Money... Labor! We also make silent gears of rawhide and Fabrilol.

Write for Circular.

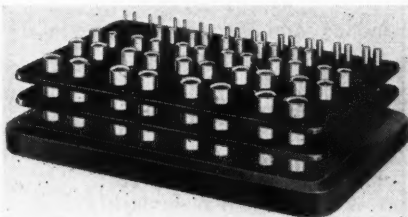


THE Greaves MACHINE TOOL CO.

2015-24 Eastern Ave.
Cincinnati, Ohio

Horberg Drill Size Pin Gages

Complete sets of either numbered, lettered, or fraction type drill size pin gages, all contained in one handy case, are now being introduced by The Horberg Gage Co., 19 Staples St., Bridgetown 1, Conn.



Horberg Drill Size Pin Gages

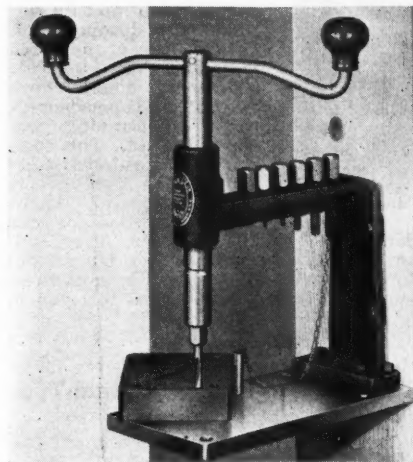
Twin gages of each size are held upright in the modern shop-tested case, with each pin being clearly identified for quick selection.

Horberg Drill Size Pin Gages are made of oil hardened tool steel to tolerances

of plus 0.0001 inch and minus 0.0000 inch and are tapered halfway up the shanks for easy insertion. Round polished tips and flat ground bottoms are additional features of the gages.

Dahlstrom Tap Guide

Designed primarily to eliminate tap breakage and reduce hand tapping time to a minimum, a tap guide which can be fastened to a post or bench and readily employed by inexperienced operators is now being marketed by the Dahlstrom



Dahlstrom Tap Guide

Manufacturing Co., 418 S. 6th St., Minneapolis 15, Minnesota.

The unit is supplied equipped with 7 adapters ranging in size from 8/32 to 1/2 inch. The tap guide has a depth of throat of 7 1/2 inches and an opening of 7 inches. The table of the unit measures 6 x 10 1/4 inches in size. Shipping weight of the device is approximately 30 pounds.

Airco No. 312 Electrode

Designed primarily to prevent under-head cracking in the welding of hardenable steels, an all-position mild steel electrode, designated as the Airco No. 312, has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. The electrode is said to be

NUMBERALL

Multi-Wheel Numbering Machine Model 70



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Model No. 70

Write for
Bulletin MS-70.

Improved Type Holders, Hand or Press Style. Super Quality Steel Type.

Type is easily, quickly loaded and unloaded. Simplest construction. A pin holds the type securely. No screws nor springs. Made in various sizes: 1/32" to 1/2" figures and letters.



Steel
Type

Write for
Literature
Model
23H MS7

Manufacturers agents wanted to represent complete line of NUMBERALL Products.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



"Limitron" Electronic Comparator in Use

Manufacturing Co., 541 Devon St., Arlington, N. J. In use, the operator merely presents the work to the spindle, with the comparator inspecting, sorting, and placing each piece in the proper bin, whether undersize, oversize, or acceptable.

According to the manufacturer, the Limitron is easily set up and its settings are tamperproof. Yellow, green, and red indicating lights provide operators a double check and inform supervisors if parts are running consistently bad. The comparator automatically counts each piece and its speed is adjustable to the piece inspected or the convenience of the operator. The Limitron has a tolerance range of from 0.0001 to 0.030 inch. The contact spindle pressure is adjustable from 4 oz. to 1 pound.

suitable for welding low alloy, high tensile steels, particularly in heavy sections; free-machining steels which normally run quite high in sulphur; and cold-rolled steels.

For material to be vitreous-enamelled after welding, the Airco No. 312 Electrode is claimed to make possible production of highly satisfactory enameled surfaces without any preheat treatment prior to the enameling operation.

"Limitron" Electronic Comparator

Known as the "Limitron," a limit type electronic comparator for automatic sorting operations is announced by the Pollak

Tennant "All-Purpose" Drum-Type Floor Machine

Developed by the G. H. Tennant Co., 2530 N. 2nd St., Minneapolis 11, Minn., the Tennant "All-Purpose" Drum-Type Floor Machine illustrated herewith is constructed to accommodate both 8 and 16-inch accessories for performing dry cleaning, waxing, polishing, scrubbing, sanding and sweeping operations in factories, offices, schools, institutions, and so

HYBCO GRINDING HEADS

For Universal Tool and Cutter Grinders.

CHAMFER SHARPENING HEAD ➡

Accurately Relieves Chamfers of TAPS—STEP DRILLS—CORE DRILLS—COUNTERSINKS—similar tools with evenly spaced flutes.

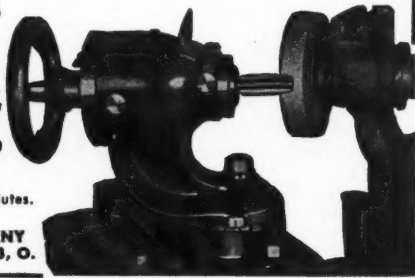


⬅ **FLUTE SHARPENING HEAD**

Sharpens Straight or Angular Flutes—GUN OR SPIRAL POINTS OF TAPS—Other tools with evenly spaced flutes.

Write for Circular GH

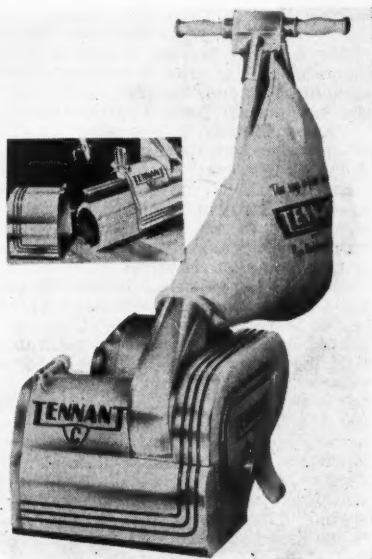
HENRY P. BOGGIS & COMPANY
1279 W. 3rd St., Cleveland 13, O.



on. By the use of a hard bar wax cartridge held in contact with a cylindrical brush or steel wool roll, cleaning, waxing, and polishing can be performed in one operation.

Suitable for all types of floors, the Tennant All-Purpose Floor Machine is claimed to work equally well on wood, asphalt, cork, linoleum, and concrete. The design of the machine permits operation flush with walls, desks, and machinery, and the vacuum system, powered by a 5,000 r.p.m. fan, is said to control dust in the performance of all operations.

Construction features of the machine include a rugged cast and polished alum-

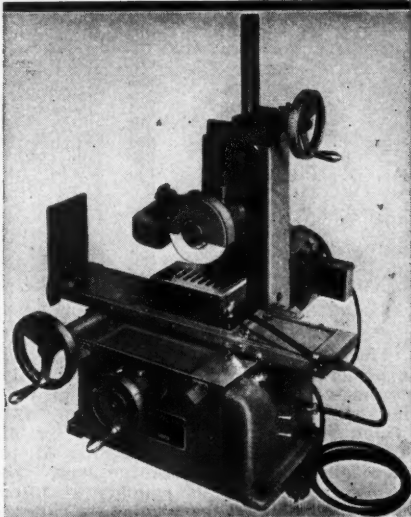


Tennant "All-Purpose" Drum-Type Floor Machine

inum frame, 1 h.p. motor with reversing lever, and two-step pulley which provides a drum speed of 1,400 r.p.m. for sanding and 800 r.p.m. for other operations. The heavy drum assembly is dynamically balanced to assure smooth, quiet operation.

Accessories available for the Tennant All-Purpose Floor Machine include a steel wool roll, steel wire brush, sanding drum, Tampico, or palmetto brush, and bar wax cartridge.

SANFORD



HIGH SPEED BENCH SURFACE GRINDER

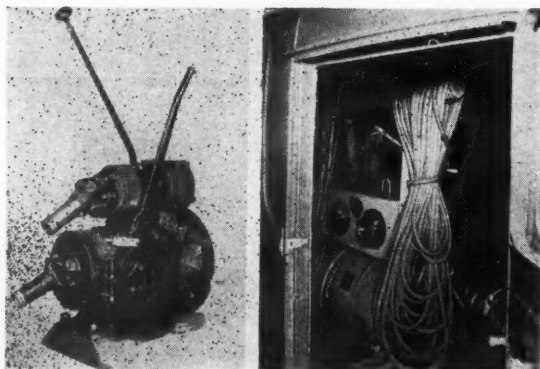
ACCURACY WITHIN .0001

A sensitive, highly accurate,
machine specially designed

*"For The Job That
Fits in Your Palm"*

Write for Bulletin

SANFORD MFG. CO.
1020-28 COMMERCE AVE.
UNION • NEW JERSEY



(Left) Tangen Power Take-Off.
(Right) Tangen Power Take-Off mounted in a truck body for driving a welder generator

Tangen Power Take-Off

The accompanying illustration shows a power take-off which can be directly connected to a truck motor, thus providing an unusually compact setup, and which is now being marketed by A. Tangen, 3269 Hobarth, Detroit, Mich. According to the manufacturer, the power take-off can be quickly installed in any Ford or Dodge truck as a permanent setup yet can be easily removed and reinstalled if necessary.

Built as a unit, the driving mechanism fits directly over the standard transmission case of the truck and does not interfere in any way with the normal use of the truck. Power is transmitted directly from the motor, and, thus, the speed of the generator is the same as that of the motor. A governor which can be cut in or out quickly is connected with the power take-off.

The Tangen Power Take-Off is available as a kit with complete instructions for mounting, or it can be installed in the truck by the manufacturer.

fluids, and the aromatics and is virtually insoluble in gasoline, kerosene, Stoddard solvent, benzene, ketones, acetones, and the various aromatic aviation fuels.

Parker Uniseal is described as a paste of uniform consistency, containing no free metallic particles which might set up corrosion due to galvanic action or other additives subject to washing out. The compound is said to flow smoothly to form ribbon gaskets and to blend readily with cut gasket material.

Easy to use, Uniseal is said to possess good anti-sieze characteristics which aid in the assembly of threaded fittings. Solubility in alcohol and carbon tetrachloride simplifies any cleanup which might be necessary, it is claimed. Said to be 100 per cent effective at temperatures above 300 deg. F., Uniseal produces a seal that breaks cleanly with the application of minimum force, thus facilitating disassembly and rearrangement of work on which the compound has been used, it is stated. The compound is available in tubes and containers ranging from 8 oz. to 5 gallons.

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ONE, FOUR and SIX spindle automatics maximum capacity 2½" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

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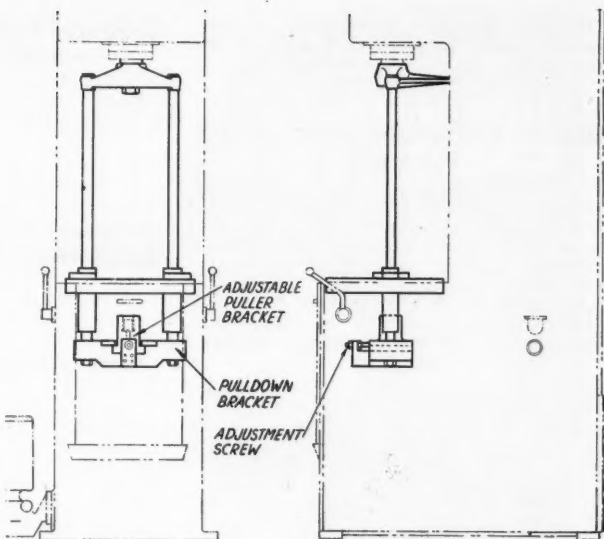
SCREW MACHINE SPECIALTY CO., • 5700 Butler St., Pittsburgh 1, Pa.

Diagram showing the application of Colonial Adjustable Pull Head to broaching machine

Colonial Adjustable Pull Head

An adjustable pull head designed to make possible quick adjustment for off-center pull broaching on Colonial Utility broaching machines has been announced by the Colonial Broach Co., Inc., Detroit 13, Mich. According to the manufacturer, the device permits the ready broaching on these machines of such things as keyways which require an off-center broach puller.

The pull head is interchangeable with

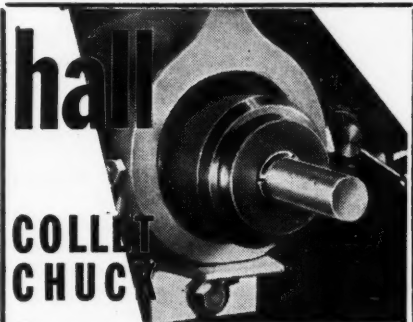


the pull-down attachment available for Colonial Utility as well as Colonial



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COLLET CHUCK
SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

Two-inch capacity, now only \$145

One-inch capacity, \$95

Round, square or hex collets, plain—serrated

HALL MANUFACTURING COMPANY

622 Tularosa Drive • Los Angeles 26, Calif.

"Junior" presses. Adjustment of the puller bracket in and out is effected by means of a screw with locking nuts.

Ellstrom Toolmakers' Master Gage Block Set

A toolmakers' set of five Ellstrom master gage blocks which are said to be accurate to plus or minus eight millionths of an inch is now being offered by the Dearborn Gage Co., 22038 Beech St., Dearborn, Michigan.

Available in 0.0625, 0.125, 0.250, 0.500 and 1-inch sizes, the gages in the set can be used to make 31 combinations in $\frac{1}{16}$ -inch

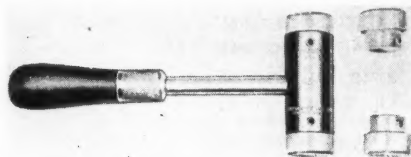


Ellstrom Toolmakers' Master Gage Block Set

steps up to $1\frac{1}{8}$ inches. All gaging surfaces are chromium plated, and each set of gages is contained in a hand-rubbed walnut case.

Gregory "Perfect Balance" Lightweight Soft Hammer

The addition to its line of "Perfect Balance" soft hammers of an extremely lightweight hammer having an aluminum



Gregory "Perfect Balance" Lightweight Soft Hammer

shank and head with replaceable plastic tips is announced by the Gregory Tool and Manufacturing Co., 5300 Tireman, Detroit 4, Mich. The hammer is available in head diameters of $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, and 2 inches, weighing from $3\frac{1}{2}$ to 26 ounces.

With seasoned maple handle, shaped to fit the hand, the Gregory Perfect Balance Lightweight Soft Hammer is particularly designed for use in experimental laboratories and shops where precision workmanship is the practice.

"Silver Hardtem" Prehardened Die Steel

To provide die casters of zinc and zinc-lead alloys with a pre-hardened die steel possessing unusual service life and machinability, the Heppenstall Co., Pittsburgh, Pa., has announced the availability of "Silver Hardtem." This die steel is produced in the form of die blocks, as well as die block bars and inserts.

H.S. Drills, Milling Cutters, Lathe Tools, H.S. and C.S. Taps and Dies, Drill Chucks, Lathe Chucks, Tailstock Turrets, Bed Turrets, Files, Special Taps and Dies, etc.

*A Complete Line
of Machine Shop
Equipment*

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CENTER TOOL CO., 151 CENTRE STREET, N. Y. 13

Prehardened, Silver Hardtem, according to the manufacturer, requires no further heat treatment by the user and offers the advantages of free-machining steel, thus eliminating the possibility of breakage or warpage. The steel can be furnished in any desired hardness, however, the usual hardness required for zinc and zinc-lead alloys is between 286 and 321 Brinnell hardness. Dies made of Silver Hardtem do not load or mutilate at the parting line, it is claimed, and the necessity for frequent removal from casting machines for surface repair is also said to be minimized.

Hamilton Automatic Stock Positioner

An automatic stock positioner has been devised by The Hamilton Tool Co., Ham-



Hamilton Automatic Stock Positioner

ilton, Ohio. The device, as illustrated, is made up basically of the working elements of the company's Portelvator and is designed to support a pile of sheet stock that is to be fed into a press, brake, shear, and so on.

With a new pile of stock on the table top, the table is lowered so that the top of the pile is at the most convenient height for feeding. As the stock is fed to the machine, the table rises at a rate that keeps the top of the diminishing

YELLOW HEAD

GRINDING WHEEL DRESSERS

Self-Lubricating

Increases cutting speed of grinder wheels; decreases cost of maintenance of the dresser . . . that's what YELLOW HEAD "Self-Lubricating" Dressers will do for you.

Dry, greaseless graphite is sucked from the large magazine in a thin film, providing constant lubrication for all moving parts. As shown above: A—Magazine for dry graphite, B—Ducts to bearings, C—Spindle bearings, D—Safety hood. Sturdily constructed, economical to operate. There's a plain type "Yellow Head" and full line of cutting heads.

YELLOW HEAD

Write for complete details and prices

CITY MACHINE COMPANY
Piqua, Ohio

stack always at the desired height. The electrical controls and motor that govern this movement are actuated by an arm and roller that "rides" on top of the pile.

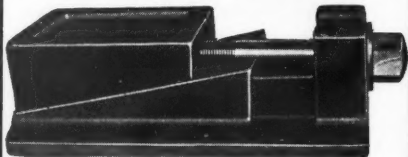
"Mixtite" Asphalt Powder Mix

Known as "Mixtite," an asphalt powder mix which can be used as a paint, plastic waterproof coating, caulking compound, patching cement, adhesive or expansion joint compound is now being marketed by the Rand-Williams Co., Inc., 377 Broadway, New York 13, N. Y. Easy to use, the material can be mixed to any consistency by simply adding an oil solvent such as kerosene, turpentine substitute, and so on.

According to the manufacturer, Mixtite will keep indefinitely and is not impaired by heat, cold or dampness. Mixtite Black is applicable for troweling or painting, and Mixtite Red and Aluminum as paint. The material is packaged in 1, 5, and 50-lb. bags. Mixtite Red is furnished in 4½-lb. bags to make one gallon of paint consistency, and Mixtite aluminum Paint in 3½-lb. paper cartons.

Do you want accurate work from your machines? . . . then use

LEVELING JACKS



Under the next heavy machines or any equipment you will install or rearrange.

Leveling jacks are indispensable and a real help to your reconversion problems making re-arrangements easy and fast.

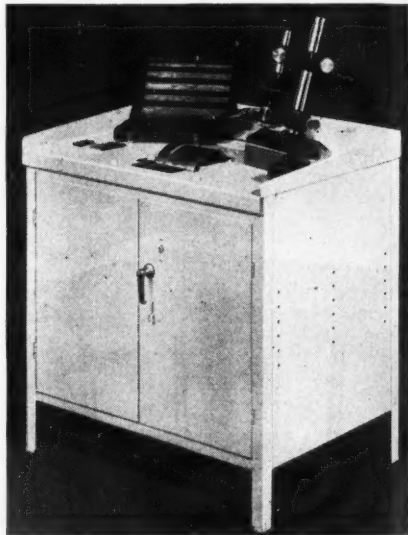
We make them in three sizes which cover the entire range of requirements.

Write for descriptive literature and prices.

Jurzek Machine & Engineering Co.
326 W. Lewiston Ave., Ferndale 20, Mich.

Size Control Model 100 Centerless Lapping Machine

Designated as the Model 100, a centerless lapping machine for the precision finishing of cylindrical pieces is announced by the Size Control Co., Division of American Machine and Gage Co., 4636 W. Fulton St., Chicago 44, Ill. According to the manufacturer, a precision finish of less than 2 micro-inches can be easily obtained with the machine, which is designed to eliminate the need for



Size Control Model 100 Centerless Lapping Machine

making setups or using ring laps or other tools.

The Size Control Model 100 Centerless Lapping Machine is furnished complete (and ready to plug in) with a set of lapping rolls ground for precision work, a vibrationless drive, a ½ h.p 110-volt a.c. motor, a set of three lapping sticks, a jar of lapping compound, and complete instructions for operation. The cabinet is complete with coolant tray and lock.

"Instrumaster" Floating Triangle

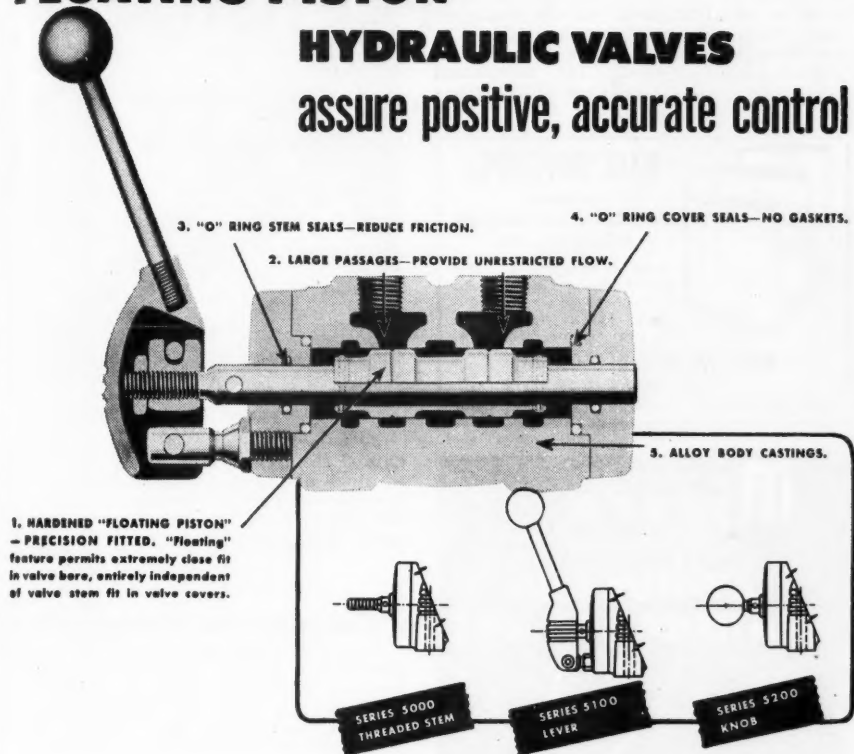
Draftsmen's time is said to be saved four ways and unusually neat drawings produced by the use of the "Instrumas-

GEROTOR

"FLOATING PISTON"

HYDRAULIC VALVES

assure positive, accurate control



For dependable oil service, involving pressures up to 3000 p.s.i., specify Gerotor "floating piston" 4-way hydraulic valves. They are made in seven sizes with five different piston designs, meeting the requirements of any hydraulic circuit. Available methods of operation are: Hand, Foot, Cam, Solenoid, Oil Pilot Pressure, and Air Pilot Pressure.

Advanced design, efficient operation, expert manufacturing . . . these are characteristics of every hydraulic valve by Gerotor.

GEROTOR MAY CORPORATION • Baltimore 3, Md.

ter" Floating Triangle now being marketed by the John R. Cassell Co., Inc., 110 W. 42nd St., New York 18, N. Y. The one-piece triangle employs integral embossed buttons to enable the lower surface to clear the drawing paper by approximately 0.020 inch.

According to the manufacturer, the Instrumaster Floating Triangle (1) provides an ideal finger lift at all points on both the inside and outside edges; (2) has excellent inking edges so that ink smears are avoided; (3) minimizes smudging; and (4) reduces shifting be-

tween 45 and 30-60-degree triangles as a result of a "two-in-one" feature—each Instrumaster 45-degree triangle has a 30-60-degree triangular opening and vice versa. The triangle is accurately ma-



WADE ENVELOPES

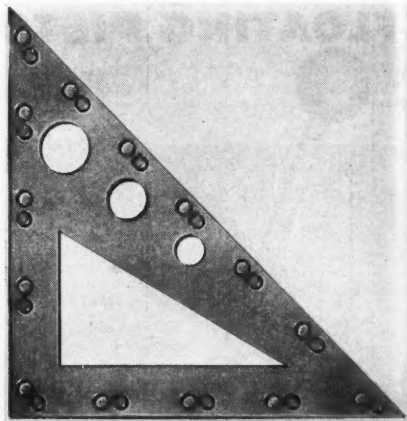
protect
**Shop Orders, Drawings,
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Made in three styles, transparent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details.

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Supreme

LAY-OUT AND IDENTIFICATION DYE



12 COLORS*

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . . Write for circular.

*Purple shipped unless otherwise specified

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chined from clear non-inflammable plastic stock and is said to be unconditionally guaranteed against warpage. It is available in 4, 6, 8, 10, and 12-inch sizes in both 45 and 30-60-degree types.

Oakite Special Protective Oil

Announcement of a product for the prevention of rust on ferrous surfaces between operations and while parts are in storage is made by Oakite Products, Inc., 20 Thames St., New York 6, N. Y. Known as Oakite Special Protective Oil,

OILY FLOOR TROUBLES stopped with FULLERS EARTH!



An oil and grease absorbent that replaces sawdust or wood shavings. Lessens fire hazard! Stops accidents due to slipping on oil or grease! Low priced—economical—safe! Write for FREE SAMPLE or ask for trial order at quantity price!

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PRODUCTO

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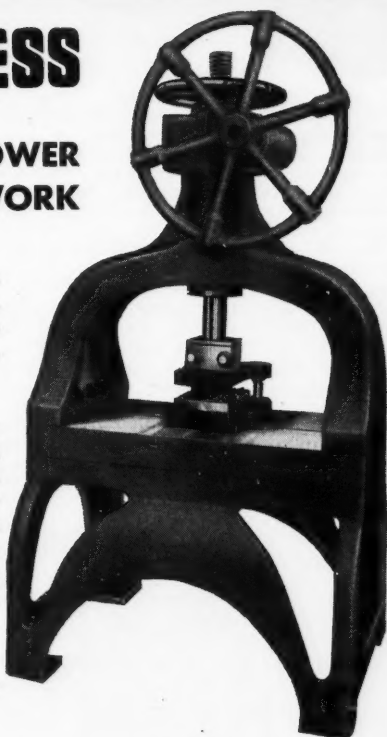
UTILITY PRESS

**VERSATILITY . . . POWER
IN TOOL AND DIE WORK**

Whether the lightest touch or a 50-ton pressure is required, this modern screw press is indispensable for the countless press jobs that confront busy tool and die rooms.

You will find it efficient for shearing, assembling and lining Punches and Dies, and for separating Punch and Die Holders on large Liner Pin Die Sets. The 3" hole in the bed allows it to be used for short broaching operations and for disassembling spindles or shafts from press fits in bearings.

Also has many Arbor and Straightening press uses.



Send for detailed circular.

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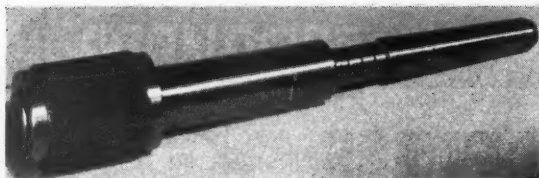
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197 LAFAYETTE ST.

CLEVELAND, 14
5345 ST. CLAIR AVE.

INDIANAPOLIS, 2
635 FULTON ST.

DETROIT, 11
3017 MEDBURY

LOS ANGELES, 21
2168 E. OLYMPIC BOULEVARD



Grip-Slide Threading Tool

the product is said to be especially useful in plants where temporary or semi-permanent surface protection from rust is desired for parts or work, following such operations as grinding, machining, pickling, tumbling, sand blasting, brazing, and so on.

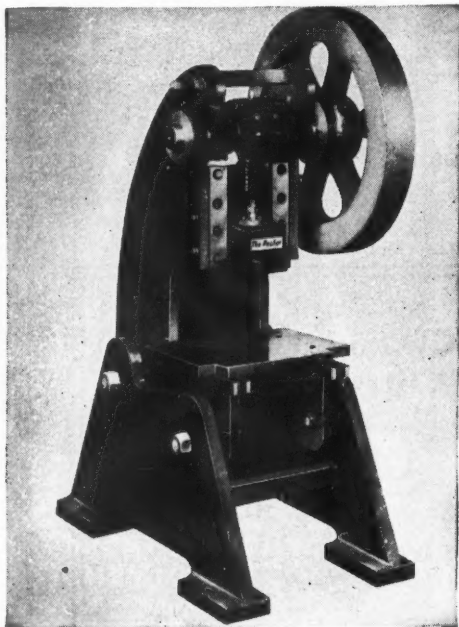
Oakite Special Protective Oil imparts a thin, transparent, rust-preventive coating which, it is claimed, does not interfere with accurate gaging or stain or discolor ferrous surfaces. Parts to be rust-proofed either may be immersed dry, or, because of the water displacing properties of Oakite Special Protective Oil, may be immersed immediately after cleaning and rinsing, while parts are wet, thereby eliminating the necessity for drying surfaces by a special hot rinse, air, sawdust, or other methods. In addition,

fingerprints or similar marks resulting from inspection or handling of machined work in process can be readily removed by adding 5 per cent water to the Oakite Special Protective Oil.

Grip-Slide

The Grip-Slide, a precision tool for use in performing both right and left-hand external and internal threading operations on lathes, is announced by the Threadmiller Corp., 17 E. 42nd St., New York 17, N. Y. To provide for long life, all parts of the tool are hardened and precision fitted.

In using the Grip-Slide, the proper die or tap is inserted in the tool and the knurled part of the tool grasped by the operator. The tool is then slid to the work. When the desired length of thread has been cut, as shown by ring calibra-



The Rocket STEEL PUNCH PRESS

(Fabricated)

45 Ton Capacity

Open back—Inclinable

Thickness of Frame . . . 2"

Shut Height 10 $\frac{3}{4}$ "

Standard Stroke 3"

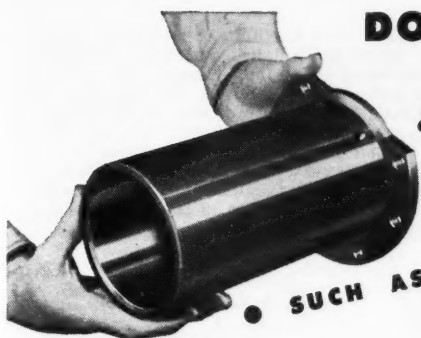
Strokes per Minute . . . 92

Write or wire for descriptive literature, price and delivery.

Rocket Punch Press Co.

1489 W. Washington Blvd.

Los Angeles 7, Calif.



DO YOU

**WEAR OUT
PARTS**

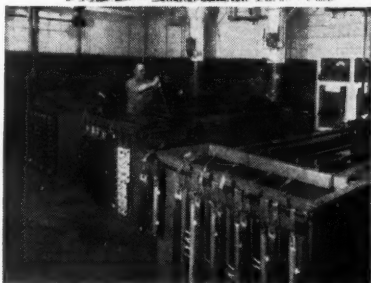
• SUCH AS THIS LINER BUSHING ?

... Or do you find yourself with worn gages ... tool holders ... burnishing tools ... boring bars ... fixture parts ... machine parts ... or similar products?

Any of these can be salvaged at Lincoln Park ... through processes of hard chrome plating and refinishing to size.

Lincoln Park has done hard chrome salvaging for many years. Hundreds of leading concerns throughout the country have used—and continue to use—this service regularly. Today, with a wealth of experience in this type of work, unexcelled facilities, and ample capacity, Lincoln Park not only offers extremely high quality salvaging work but can complete every job quickly—deliveries usually being much faster than would be required if new products were ordered.

The range of work which can be handled efficiently includes holes up to 16 inches in length and external plating and refinishing up to 5 feet in length. We will be glad to supply you with further information or to submit quotations on any salvaging work you may be considering.



Lincoln Park's modern plating department is devoted exclusively to hard chrome.

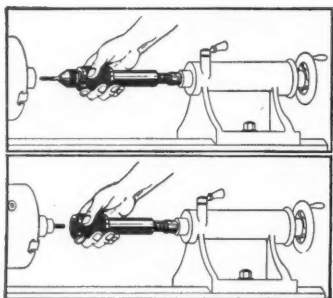


Lincoln Park

INDUSTRIES, INC.

1733 FERRIS AVENUE • DETROIT 25, MICHIGAN

tions on the guide bar, the grip on the tool is released, the lathe reversed, and the knurled part of the tool again grasped, with the tool then backing off. Following this, the work is changed and



When tapping or thread-cutting with the Grip Slide, the tool is held with the hand until the tap (above) or the die (below) has cut far enough. The Grip Slide is then released, allowing the tool to revolve with the work.

the operation repeated, without the need for shifting the tailstock or turning the tailstock spindle. Moreover, all danger of the operator's hands being hit by spinning obstructions is claimed to be eliminated.

Optimus Floor Cleaner No. 1F10

Designated as the No. 1F10, a heavy duty floor cleaning compound, especially compounded for use on cement, Terazzo, or tile floors has been announced by the Optimus Detergents Co., 160 Church St., Matawan, N. J. Although very effective in removing oil, grease, and other dirt

from the surface, the material does not harm the finish in any way, it is claimed.

Optimus Floor Cleaner Co. 1F10 is a base from which a liquid floor cleaner can be made, or it can be applied to the surface directly and then rinsed off. Used in lower concentrations, it is said to be very effective in industrial floor scrubbing machines. The cleaner is available in 150 and 500-lb. containers.

New Films

Thermit Welding Film

"Mass Production of Massive Parts" is the title of a 16 mm. sound and color motion picture announced by the Metal & Thermit Corp., 120 Broadway, New York 5, N. Y. The film portrays the possibilities of fabricating very heavy parts for equipment of all kinds by means of Thermit welding and shows the methods employed during the war by The California Shipbuilding Company in constructing thousands of 40-ton stern frames for cargo ships.

Prints are available without charge for showing to local sections of engineering and technical societies, as well as interested industrial concerns.

Meehanite Casting Film

The Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y., now has available for use by interested societies, groups, or companies a 16 mm. black-and-white sound motion picture entitled "Meehanite Means Better Castings."

Educational in nature, the film, which has a running time of 29 minutes, pro-



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Easy Does it! with POWERFUL PRESSES
THAT NEED NO POWER

It's easy to use FAMCO Arbor Presses. They need no power, yet an arm can deliver up to 15 tons pressure. Easy to install, they're space savers and do hundreds of assembly and dismantling jobs. 32 ruggedly constructed models are available. Write for descriptive folder today.

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Model 6C

*What size
is this
Socket Screw?*



EXPERIENCED MEN GUESSED WRONG 60% OF THE TIME!
Tests have shown that even experienced men have guessed wrong on size and thread pitch of socket head cap screws 50% of the time.

SINCE THEY CAN'T BE SURE, your assembly workers must take time to find out - time for "miking" and gauging to check the size - time for tedious sorting when screws get mixed up.

There's No Guessing when it's Size-Marked!

On the heads of P-K Socket Head Cap Screws, the size is clearly marked - seen at a glance.

THERE'S NO TIME WASTED -

AT THE TOOL CRIB - Left-over, mixed up screws are quickly replaced in the right box or bin, without slow "miking" or gauging.

AT THE JOB - Assemblers work faster - take no time out "going back" to replace a size issued incorrectly.

TRAINING NEW HELP - Even new assembly workers can be trusted with P-K Size-Marked Socket Screws - make no costly errors.

BY MAINTENANCE MEN - Your customer's repairmen will appreciate the Size-Mark in disassembly and reassembly. It gives your product an extra sales feature.

Plus GEAR GRIP*

With Gear Grip, which prevents slipping and fumbling, the Size-Mark gives P-K Socket Head Cap Screws a double feature that puts them years ahead in utility and performance.

*U. S. Pat. No. 136,400

Only PARKER-KALON offers
Socket Head Cap Screws with
SIZE-MARK and GEAR GRIP



Another P-K Plus Value! GROUND THREAD SOCKET SET SCREWS

Thread grinding provides a smooth, bright, gleaming finish that has none of the nicks, burrs, tool marks, hardening scale, or imperfections common to ordinary cut thread set screws. Made from hardened stock, with the characteristic smoothness of a ground finish, these screws are as different from ordinary set screws as night and day!

Seeing is Believing!

Send for this unique SAMPLE KIT. Compare. You'll agree your assemblies deserve the many advantages of these 3 extraordinary P-K improvements. Write today! Parker-Kalon Corp., 200 Varick St., New York 14.



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PARKER-KALON Cold-forged SOCKET SCREWS

vides a comprehensive story of the engineering characteristics of Meehanite Castings and their industrial applications. A print will be loaned upon request.

New Books

How to Evaluate Supervisory Jobs. By Albert N. Gillett. Published by The National Foremen's Institute, Inc., Deep River, Conn. 141 pages, 8½ x 11 inches in size. Loose-leaf gold stamped fabric binder. Price, \$7.50 f. o. b. shipping point.

With the status of foremen of vital concern to management, this manual endeavors to provide detailed answers to two key questions: What is the supervisory job worth? How good is the man occupying that position? The author seeks to avoid the costly mistakes of administration common to the usual trial-and-error method in the selection and payment of supervisory personnel by providing definite, detailed methods for evaluating the job and appraising the job holder. A kit of blank forms, included

as a part of the manual, makes it a practical working tool.

The manual is divided into three sections. Part I explains and describes the job-analysis-rating-evaluation of supervision method, which enables management to determine how much the job itself is worth in either hourly rate or salary range.

Part II is devoted to a detailed description of a definite plan by which management can determine the weak and strong points of the individual occupying the supervisory position.

Part III supplies the reader with a working kit of blank forms for conducting his own tests—22 forms in all, printed on heavy ledger paper, designed for actual use and applicable to both plant and office personnel.

To make the manual thoroughly useful, the author has included typical forms to demonstrate actual job evaluation; actual job performance appraisal forms, completely filled out; 34 detailed instruction sheets; and 11 illustrated charts.

What's Ahead for the Veteran? By Ted Handelman. Published by National Foremen's Institute, Inc., Deep River, Conn. 22 pages, 3¼ x 5½ inches. Heavy paper cover. Price, 15 cents.

In this pocket-size booklet, the author, an industrial relations expert and former Army correspondent and writer for the newspaper "The Stars and Stripes," speaks to his fellow veterans as an ex-G.I., discussing: Our Liabilities as Servicemen; Our Assets; Getting up to Date on Work Methods; Becoming a Skilled Worker, and so on. Also included is an outline of the veteran's legal rights and benefits; sources to contact for detailed information, a list of important records to be kept, and other useful data.



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Comes in Blue, Black, Orange, Red. Dries fast. Oil resistant. Won't chip, crack or flake off. Also ideal as marking dye. Get 8 oz. brush-in cans, pts., qts., drums. **SAMPLE FREE!**

TAMMS SILICA COMPANY
228 N. LaSalle St. • Chicago 1, Ill.

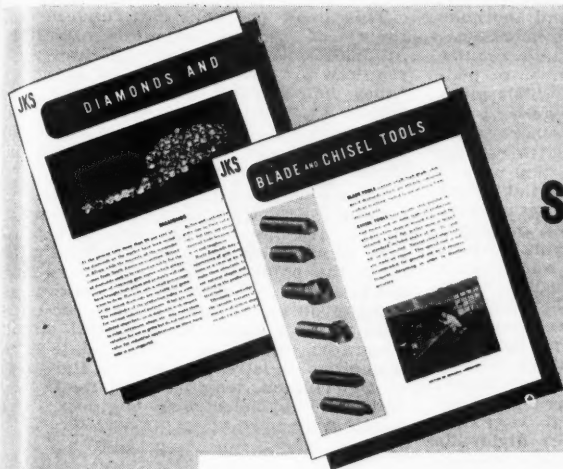


**PRESSES
FEEDS
AUTOMATIC
EQUIPMENT**

The V & O Press Company, Incorporated
HUDSON, NEW YORK

Lincoln's Incentive System. By James F. Lincoln, president, The Lincoln Electric Co., Cleveland, Ohio. Published by The McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 192 pages. Cloth binding, gold-embossed cover. Price postpaid United States, \$2.00 (elsewhere, \$2.50).

This book presents completely the successful management plan of the author's industrial organization where up to the present time not one hour of production time has ever been lost due to strikes. As the result of actual, successful application of the incentive system in in-



**SHOWS ALL...
TELLS ALL**

NEW JKS INDUSTRIAL DIAMOND TOOL CATALOG

With pictures, diagrams, figures and facts, the new JKS Industrial Diamond Tool Catalog is off the press and ready to show you how to get maximum results from diamond tools . . . why they are piling up savings in time and money for so many types of industry today.

This 64-page plastic bound catalog offers you interesting and helpful information on diamonds themselves and all types of JKS industrial diamond tools. Twenty pages are devoted to JKS Standard Tools, adaptable to 73 different makes of machines . . . listed by the equipment manufacturers' name. Send for your free copy of this useful catalog on your company letterhead today.



J. K. SMIT & SONS, Inc.



157 CHAMBERS ST., NEW YORK 7, N. Y.

dustry, the fundamentals and methods of the plan as it may be applied universally in all activities which require cooperative action by a number of people are clearly demonstrated. This presentation points out to management the extreme practicality of the cooperative system of incentives and illustrates step by step the details of its practical use.

The purpose of the book is not to set forth a conclusive formula or set of rules for the successful application of an incentive plan. Rather, its prime purpose is to state the principles and results achieved by The Lincoln Electric Company. The forepart of the book provides complete details of how the company has applied incentives over a long period of years and explains fully how the following summarized results were obtained: (a) production per man increased many times, (b) take home annual wages increased over four times, (c) dividends increased three times, (d) people employed increased four times, (e) prices reduced 60 per cent, and (f) dividends have been paid continuously for over 25 years.

Each of the following subjects are thoroughly explained in the book's 12 chapters: Results of Incentive System; How to Develop the Worker; Why New Leadership Is Necessary; How Should Income Be Divided; Government and Income; Collective Bargaining Is Civil War; The Advisory Board; How Jobs Are Made; How to Install Piecework; How to Install the Incentive System in a Going Concern; Starting a Business Under the Incentive System; and Economics of Incentive Management.

Luminous Tube Lighting. By H. A. Miller. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 143 pages. Cloth binding, board covers. Price, \$3.50.

This book presents the fundamental theory of gaseous ionization and light production and lists materials and their required properties for use in luminous tubes. The various manufacturing processes in developing low-pressure and high-pressure luminous tubes, both of the low-voltage type and high-voltage types, are discussed in detail.

Luminous tubes comprise mercury and sodium discharge lamps, fluorescent lamps, and low-pressure and high-pressure neon tubes. Each type is dealt with from the point of view of construction and operation. Considerable attention has been given to the low-pressure tube and also to neon signs. Many useful circuit diagrams, tables of lighting data, and numerous illustrations add to the value of the volume, which should readily be welcomed by electrical engineers and contractors.

New Shop Literature

"Punching, Shearing, Bending" is the title of a 24-page bulletin published by the Buffalo Forge Co., P. O. Box 985, Buffalo 5, N. Y. Reprinted from a series of articles by William C. Tucker, assistant chief engineer, Machine Tool Division, Buffalo Forge Company, the booklet, which is illustrated throughout, is available free upon request.

"Die Slick" Lubricant for die-casting dies used in casting aluminum, zinc, magnesium, and brass alloys is described as to advantages, applications, prices, and so on, in a six-page pocket-size folder now available free from G. W. Smith & Sons, 116 S. Sperling Ave., Dayton 3, Ohio.



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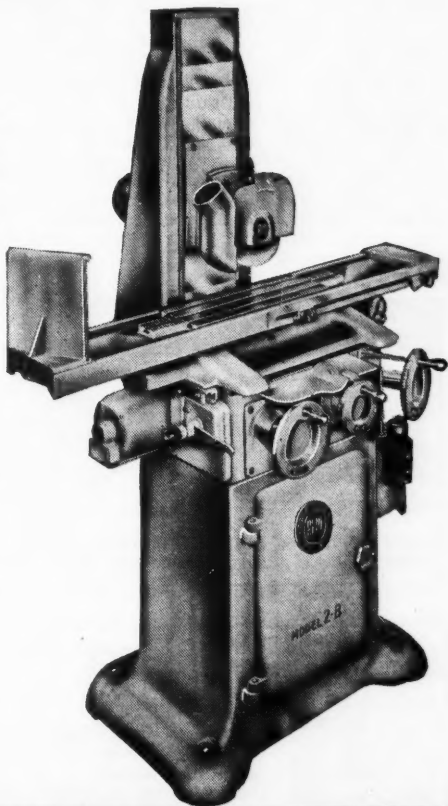
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Progressive Standard Flash Welders are the subject of an eight-page two-color technical and descriptive bulletin released by the Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich. Phantom and detail views are provided to illustrate the numerous exclusive features of these welders, which are available in sizes from 20 to 250 kva for a wide range of flash and butt welding applications. Copy free upon request.

"Hastelloy Facing for Corrosion Resistance," a four-page folder now available free from the Haynes Stellite Co., Kokomo, Ind., describes a process used to protect chemical-plant and oil-refining equipment from corrosion. The folder discusses two new ways that have been developed for applying Hastelloy only to those surfaces of equipment that are exposed to corrosive agents. In addition the folder provides concise data on the grades of Hastelloy available, and the corrosive media they will resist; parts that can be Hastelloy faced; procedures used in Hastelloy facing; and procedure for facing with welding rod and with sheet and plate.

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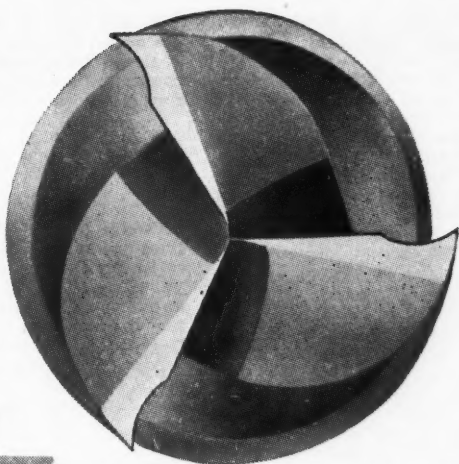
Lassy Single Spindle Tapper and Threader which is said to be ideal for small-lot production is fully illustrated and described as to advantages, construction features, specifications, and so on, in a four-page folder issued by the Lassy Tool Co., Plainville, Conn. Copy free upon request.

"Specification Index for Bristol Instruments" is the title of a 24-page catalog published by The Bristol Co., Waterbury 91, Conn. Designated as the No. W1800, the catalog contains information on the Bristol line of automatic controlling, recording, and indicating instruments and provides hints on how they can be used effectively to save time and promote efficient operation. Specification data are provided on each instrument listed, and the catalog is well illustrated with line drawings which show basic methods of applying various types of industrial instruments. Copy free upon request.

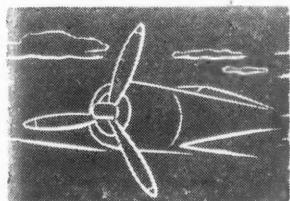
"Belt Sanding of Metal" is the subject of a 12-page illustrated bulletin released by the Clover Manufacturing Co., Norwalk, Conn. The bulletin provides descriptive information on the following subjects: "Belt Sanders;" "The Machine-Shop Bench Sander;" "Substitution of an Abrasive Belt for the Grinding Wheel;" "Polishing and Grinding Irregular Surfaces;" "Vertical Belt Sanders;" "The Use of Coolants;" "The Use of the Standard Glue Bonded Belt with a Coolant;" "Converting a Dry Sander for Use with an Oil Coolant;" and "Sanding Small Pieces." Copy free upon request.

"Progress in the Science of Precision Measurement Recognized by The Smithsonian Institution," a booklet published by The Sheffield Corp., Dayton 1, Ohio, explains the permanent display of precision measuring instruments and the history of measurement inaugurated during the past year at the Smithsonian Institution, Washington, D. C. In addition to complete illustrated and descriptive information concerning the ceremony accompanying the inauguration, the booklet includes illustrations together with condensed descriptions of the Sheffield "Precisionaire," "Multichek," "Visual" Gage, and "Electricheck." Copy free to interested executives upon request.

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Cooper Certified Stainless Steel Valves and Fittings are the subject of a folder prepared by The Cooper Alloy Foundry Co., Bloy St. & Ramsey Ave., Hillside, N. J. Included is an announcement of the company's new procedure of registering stainless steel heat analyses and stamping all castings with corresponding numbers for permanent identification.

Diagrams show four of the many types of Cooper Certified Valves available, as well as a variety of fittings. Copy of the folder is available free upon request.

"Clean Oil" presents four new Honan-Crane Products. Announcement of four new products, two sump cleaners and two coolant filters, is contained in the latest issue of "Clean Oil," the house organ published by Honan-Crane Corporation, a subsidiary of Houdaille-Hershey Corporation.

Pages 4 and 5 detail a case history of Honan - Crane oil purification in the Steckel cold-rolling mills of the Thomas Steel Company, Warren, Ohio. The article explains two problems experienced by the steel mill, tells how both were overcome, and shows the results obtained through a Honan-Crane installation.

Under the headings, "Oil Purification Has Come a Long Way" and "Research is Key to Future Progress," pages 6 and 7 discuss development of oil purification in recent years, the present-day application of this operating principle, and the place laboratory research holds in solving the increasingly complicated problems related to the purification and use of purified oils in modern industrial processes.

Volume 2, No. 1 of "Clean Oil" will find a place in the permanent files of those who receive it. Copies will be mailed on written request to Honan-Crane Corporation, 682 Wabash Avenue, Lebanon, Ind.

EC&M Type R Magnets (12 to 29-inch diameter) for odd job lifting applications are covered in complete detail as to uses, construction features, and so on, in a four-page illustrated bulletin released by The Electric Controller and Manufacturing Co., 2700 E. 79th St., Cleveland 4, Ohio. Copy of Bulletin 904 free.

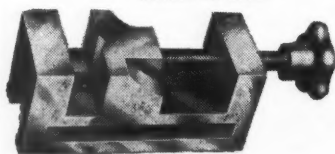
"Gripco" Lock Nut for general industrial use is fully illustrated and described in an eight-page pocket-size folder prepared by the Grip Nut Co., 310 S. Michigan Ave., Chicago 4, Ill. Complete tabular data on the various sizes in which the nut is available, together with list prices per one thousand, are also included in the folder, copy of which is available free upon request.

O. M. W. Shape Cutting Machine with circle cutting capacity of 0 to 30 inches and straight-line cutting capacity of 65 inches is fully illustrated and described in a four-page bulletin prepared by the Ohmstede Machine Works, 897 N. Main St., Beaumont, Texas. Copy free.

Elinco Type "FB" Motors and Generators for both base and frame mounting are described in detail in a 12-page two-color catalog now being offered by the Electric Indicator Co., Stamford, Conn. Among the units pictured and discussed are permanent-magnet a. c. and d. c. generators, split-field d. c. motors, permanent-magnet d. c. motors, series and universal motors, and shunt-wound d. c. motors. Construction features and characteristics of all types are presented, and performance curves are shown for typical units. Copy of Catalog "FB" free upon request.

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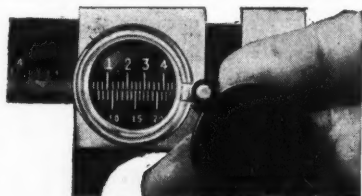


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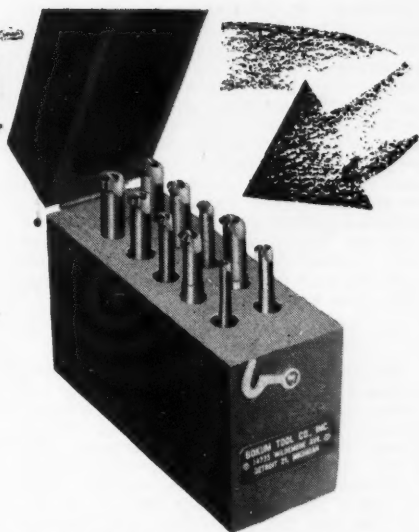


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You'll prefer Bokum Tools for boring—once you use them—because the clearance angle remains constant through entire life of tool—resharpening never changes form of tool, since only one face is put to grinder—down time for regrinding reduced—finish lapped cutting surfaces produce better bores with faster speeds.



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Ask for catalog B-1139 for high speed steels—catalog B-398 for carbide tipped.



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"Pobco" Wood Bearings. The Paramount Oilless Bearing Co., Inc., Worcester 3, Mass., has prepared a four-page illustrated folder which provides information on the physical characteristics, features, installation, operation, and selection of oilless wood bearings for use in addressing machines, traction machinery, automobile heater motors, casters, conveyors, die polishers, electrical appliances, electronic devices, fans, hoists, grinding machinery, spraying machines, vacuum cleaners, washing machines, wire rolling machinery, motion picture cameras and projectors, and so on. Copy free upon request.

Waldron Series "A" Flexible Coupling is the subject of a 20-page catalog now being distributed by the John Waldron Corp., Coupling Division, New Brunswick, N. J. The catalog contains complete illustrated and descriptive information concerning the various types in which this coupling is offered, as well as complete tables on gear coupling ratings. The center spread of the catalog is devoted to illustrations depicting typical coupling installations. Copy of Catalog No. 57 free upon request.

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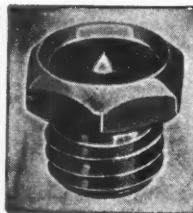
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Pen-Kote 500 Chemical-Resistance Maintenance Paint is the subject of a four-page illustrated bulletin published by the Peninsular Chemical Products Co., 6795 E. Nine Mile Rd., Van Dyke, Mich. Illustrations of typical jobs show how this quick-drying, odorless protective coating may be readily applied to heated, wet, and porous surfaces of all kinds. Unretouched photographs of test strips demonstrate the protection provided by a single coat of Pen-Kote 500 against hot acids, alkalies, and water. Copy free upon request.

Delloy Cutting Tools. A revised and enlarged catalog of cutting tools has been issued by the Delloy Metal Corp., 1221 E. Erie Ave., Philadelphia 24, Pa. This fully illustrated catalog lists sizes, types and prices in which Delloy tools, tips, and bits are available. It also contains technical information on the physical and mechanical properties of Delloy metals. cutting speed chart, and specific data as to form tools and precision castings. Copy free upon request.

Revolvator Bulletins. Designated as the 95 K2 and 96 D2, two bulletins punched for insertion in the loose-leaf catalog published by the Revolvator Co., 8th St. at Bergen Turnpike, North Bergen, N. J., are now being distributed by this firm. Printed in three colors, Bulletin 95 K2 illustrates and describes the Red Giant Model G Hand Litruck which is so constructed as to permit the raising of a load with the handle at any angle through 250 degrees. On the second page of this bulletin is a detailed view of the forward section of the truck with portions cut away so that the operation of lifting may be explained. One of the front wheels is also cut away to show the Timken roller bearings which are standard equipment. Detailed dimension figures are also included.

Bulletin 96 D2 illustrates and describes a hinged model portable elevator with motor and herringbone worm-gear drive combined with a magnetic brake. A detailed view of the self-contained hoist unit in position on the frame of the elevator is provided. The back page of the bulletin is devoted to special machines of the same general type including explosion-proof equipment, anti-slip platforms, special floor locks and folding skids for loading barrels and drums. Copies of Bulletin 95 K2 and Bulletin 96 D2 free upon request.

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KENNAMETAL K6 Machines CAST IRON

with Maximum Economy

Kennametal Grade K6 is one of the most useful and needed recent developments in tool materials for machining cast iron and non-ferrous metals. It is an improved tungsten carbide having unusual strength in combination with exceptional abrasion-resistance and high hardness. The four performance studies outlined below are typical of scores of comparative series results that clearly show the superior properties of K6 for interrupted and continuous cutting on cast iron.

URNS OUT 10 TIMES AS MANY PIECES, ON ROUGH CASTING, BETWEEN REGRINDS

One to four pieces between grinds was the best performance recorded by other carbides on machining a webbed flange of inferior grade cast iron, having hard spots, and sand pockets. K6 turns out more than 40! Operation—turning outside diameter and facing both sides of hub and rim. Feed—.032". Depth of cut 1/16" to 3/8". SFM-280.

CUTS 35 PIECES (on Abrasive Electric Iron) AS AGAINST 3 FOR

CARBIDE PREVIOUSLY USED

This unique tool, tipped with Kennametal K6, turns out 11½ times as much work between grinds as the carbide tool previously used. Operation—finish trepanning cut on electric iron part. Feed—.003". SFM-210. Accurate tolerances and good finish required. and produced.

REMOVES TONS OF METAL FROM CHILLED CAST IRON PARTS, AT TOOL COST OF 7¢ PER TON

Style 12 Tool with K6 tip turns 1½ lineal miles between grinds! Other makes of carbide failed at all speeds and feeds. After 10 regrinds K6 tip is used on lighter jobs. Operation—turning cast iron piston trunks, 2½" diameter, having six 3" or 4" ports (interrupted cut). Chilled around port holes. Very sandy surface. Feed—.09375". Depth of cut—¼". SFM-120.

MULTIPLIES OUTPUT, ON FACING OPERATION, ON SANDY IRON CASTING

Replacing another make of carbide with a Style 11HD Tool having a clamped-on, advanceable K6 tip, made possible tripling the feed, doubling the cutting speed, and facing 8 times as many pieces per grind. Operation—facing sandy iron castings. Feed—.086". Depth of cut—¼" to 3/16". SFM-150 at start, 320 after tool entered cut.

The best way to prove that K6 makes possible better, faster machining on cast iron, at lower tool costs, is to try it in your own shop—then compare tool performance and overall costs. Order a few Kennametal blanks, or complete tools, now—and ask our district field engineer, who is fully acquainted with the properties of K6, to help you get maximum results from this new and improved tungsten carbide—Kennametal Grade K6.

KENNAMETAL
ENGINEER CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

Bristol pH Equipment. The Bristol Co., Waterbury 91, Conn., has issued a bulletin describing its line of continuous pH controllers and recorders, including electrode assemblies and accessories. In addition, the bulletin contains engineering and technical information relative to pH theory and measurement. A variety of actual installations are described, with chart records, photographs, and flow diagrams included. Copy of Bulletin No. pH1302 free upon request.

Walton Tap Extractors. A descriptive folder covering its complete line of tap extractors has been prepared by The Walton Co., 94 Allyn St., Hartford 3, Conn. Listed are ten tap extractors designed especially for the quick and easy removal of broken pipe-threading taps. Copy free upon request.

G. & L. Accessories and Attachments. A 48-page book covering the purposes, uses, and features of accessories and attachments for G. & L. Horizontal Boring Machines has been published by the Giddings & Lewis Machine Tool Co., 146 Doty St., Fond du Lac, Wis. Information is prominently separated in box form on each page and tells concisely how, when, and where to use each item listed. Descriptive details are provided on boring bars, boring heads and tools, clamping accessories, holding attachments, milling attachments, precision devices, rotary tables, support attachments, and turning attachments. Illustrations of the individual accessory and attachment are presented together with an actual operation photograph of the equipment.

Copy of the book is available free to mechanical executives addressing requests on their company letterheads.

Hardinge Precision Ground Circular Form Tools for automatics, chucking machines, and turret lathes are covered as to features and specifications in a four-page illustrated bulletin published by Hardinge Brothers, Inc., Elmira, N. Y. Copy of Bulletin F free upon request.

Hobart Arc Welding Electrodes. The Hobart Brothers Co., Troy, Ohio, has released a strip folder announcing its complete postwar line of arc welding electrodes. This handy pocket-size folder provides information on the application of and the procedure followed in using the electrodes, as well as data on the physical properties of deposited metal and available sizes of each type electrode. Copy of Folder DM-710 free upon request.

Ketos Oil Hardening Tool Steel for blanking dies, broaches, drawing dies, gages, taps, thread rolling dies, and numerous other applications, is the subject of a four-page data sheet now available free from the Crucible Steel Company of America, 405 Lexington Ave., New York 17, New York.

Westinghouse Motor Service Plans. Three service plans that are claimed to provide 100 per cent service coverage for all fractional horsepower motors are explained in a 12-page booklet announced by the Westinghouse Electric Corporation. The booklet describes in detail all three of these plans, tells who is entitled to use them, how they operate, and what can be accomplished when they are properly used.

Copies of Booklet B-3711 are available from the Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pennsylvania.

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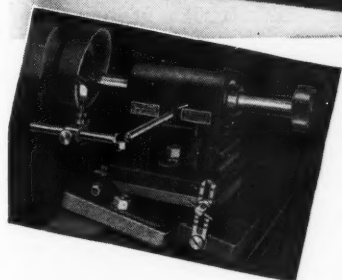
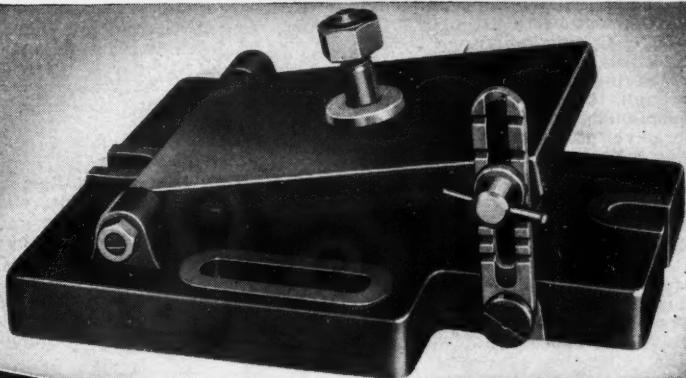
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Easily attached to any standard Weldon Sharpening Fixture. No alterations are needed. The Sub-Base is securely bolted to fixture through the same slot used to fasten fixture to grinding machine. Needed in every tool room.

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3000 WOODHILL ROAD

Weldon Roberts "Brightboy" Burring, Finishing, and Polishing Catalog. Published by the Brightboy Industrial Division, Weldon Roberts Rubber Co., Newark 7, N. J., this illustrated catalog contains records of machine speeds, time and work savings up to 20 per cent and more through the use of "Brightboy" rubber-cushioned wheels, sticks, and other abrasive products in performing simultaneous burring, finishing, and polishing operations. Copy of Catalog No. 57 free upon request.

Aeroil "Midget-6" Plast-O-Dip Tank. A leaflet containing complete specifications, illustrations, and descriptive matter on a one-gallon portable plastic coating melting tank especially designed for use in the protective coating of plugs, gages, carbide-tipped tools, and so on, is now being distributed by the Aeroil Products Co., Park Ave. at 57th St., West New York, N. J. Copy free upon request.

Sutton Collets and Feed Fingers for automatic and hand screw machines, lathes, and milling cutters are illustrated and described in a two-color 28-page catalog published by The Sutton Tool Co., Sturgis, Mich. Specifications and prices are listed for each size of round, square, or hexagon and master collet, as well as solid and super feeders. Illustrations are included of each type collet and feeder. Sutton full-floating collets for hot and cold rolled stock are described, with details of the interchangeable and replaceable diamond-serrated jaws illustrated. Likewise covered are the advantages of the Sutton Super Feeder, such as the compressed spring principle permitting equalized and direct gripping pressure. Copy of Catalog No. 16 free upon request.



M-D Facing Heads
With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

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130 PHILADELPHIA ST. HANOVER, PA.

"Electrolizing" a process that combines high voltage with a chemical bath and a rare metal to produce an extremely hard case on the cutting edges of tools, is the subject of a six-page question-and-answer folder prepared by the Tool Electrolizing Co., 148 W. River St., Providence 1, R. I. Copy free upon request.

Rex High Speed Tool Bits are covered as to available brands, characteristics, applications, and so on, in an eight-page folder published by the Crucible Steel Company of America, 405 Lexington Ave., New York 17, N. Y. Suggestions on tool bit grinding and a tool bit stock list are included in the folder, copy of which is available free upon request.

Wales-Strippit Type "BL" Hole Punching Units for punching sheet metal up to 1/8 inch thick are fully illustrated and described as to available types, construction features, methods of installing, applications, and so on, in a 40-page three-color catalog published by the Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y. Complete price information, dimensional data, and diagrams illustrating hole punching unit setups are included in the catalog. Copy of Catalog BL is available free to mechanical executives addressing requests on their company letterheads.

Northwest Cleaning and Drawing Compounds. A 24-page catalog of information regarding 39 different cleaning and drawing compounds has been released by the Northwest Chemical Co., 9310 Roselawn, Detroit 4, Mich. Five general classifications of cleaners are covered; namely, (1) electrolytic, (2) immersion, (3) solvent, (4) spray, and (5) water wash compound for spray booths. The five types of drawing compounds that are described are: (1) Superdraw "B" for brass and brass alloys, (2) Superdraw "V-113" for cold rolled steel, enameling iron, stainless steel and aluminum, (3) Superdraw "V-125" for steel alloys and stainless steels, (4) as well as aluminum and brass, and (5) Superdraw "M-99" designed for particularly heavy draws where only graphite or sulphur has been successful in the past. Particular attention is given to the "Lo-Hi" pH process of cleaning metal preparatory to enameling or plating. Copy of catalog free upon request.

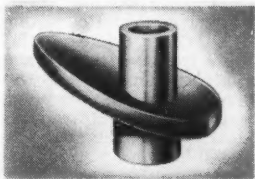
LEPEL SPARK-GAP CONVERTERS AT WORK

NO. 1

FASTER SOLDERING OF BRASS PARTS

One middle-west manufacturer installed a Lepel induction heating unit to step up the soft soldering of brass parts. The operator assembles the brass flange, bushing and pre-formed solder ring on a ceramic pin attached to a conveyor belt. The belt carries the assemblies through a tunnel-type load coil, where the solder melts immediately, firmly and uniformly joining the parts.

The quick heating cycle ended discoloration, and as the pre-formed solder ring consists of a pre-determined amount, solder waste and excessive cleaning were eliminated. Only limiting factor in production is the speed of the belt and skill of the operator.



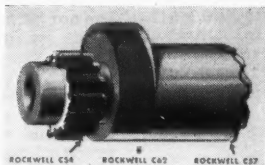
HARDENING TIME CUT 87.3%

A manufacturer of precision machinery was differentially hardening areas on a machine part. Using the lead-pot method consumed 66.94 hours per hundred pieces. With the installation of Lepel High-Frequency Induction Heating equipment, the

IF YOU HAVE A PROBLEM in joining, heat treating or melting of ferrous or non-ferrous metals, chances are that a Lepel High-Frequency Induction Heating Unit can help you do a better, faster, more economical job. Lepel metallurgists and field engineers will be glad to make a thorough study of your specific problem, and help you put the right portable, compact, Lepel unit on the job. Call, or write, Lepel High Frequency Laboratories, Inc., 39 West 60th Street, New York 23, N. Y.

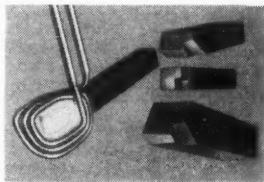
Note: Our new catalog is just off the press. Send for it.

same operation is performed in 9.03 hours, a saving of 57.91 hours, or 87.3 per cent.

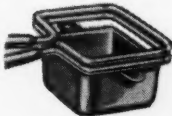


BRAZING COSTS REDUCED ON CARBIDE CUTTING TOOLS

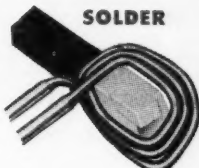
Leading cutting-tool manufacturers are discarding the torch in favor of high-frequency induction heating in their brazing operations on tungsten-carbide tips. They find that it cuts brazing time, eliminates all guess-work, and insures a uniformly sure bond at a substantial saving of both time and money. Today, the trend in tool rooms is toward this same technique for tool salvaging and tip replacing.



HARDEN



SOLDER



BRAZE



MELT



ANNEAL
STRESS RELIEVE
PREHEAT
NORMALIZE

... ferrous and
non-ferrous metals
with the SAME
Lepel unit

PIONEERS IN INDUCTION HEATING



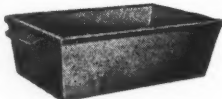
Lipec Bar Feeds. The Life-Rollway Corp., Syracuse 1, N. Y., now has available two pieces of literature, one of which illustrates and describes the Lipec-Pneumatic-Automatic Bar Feed for hand and automatic screw machines, while the other treats of the Lipec-Pneumatic Bar Feed for multiple spindle automatics. Copies of either or both of these pieces of literature are available free.

Simplex Automatic Drilling Units with drill capacity ranging from No. 54 to 1/4-inch diameter are illustrated and described in a four-page bulletin issued by the Simplex Tool Engineering Co., 2540 Park Ave., Detroit 1, Mich. Price information concerning these units is also included in the bulletin, copy of which is available free upon request.

Micronoil Electronized Lubricants. Protective Coatings, Inc., Box 3985, Detroit 27, Mich., now has available a six-page folder descriptive of Micronoil Gage-Lube; Moldeze, Riso (rust-inhibiting soluble oil); Kutlube; No. 100 Machine Lubricant; Lubrigear; Pentralube; Instrument Oil; Gun-Lube, Reelube; and Lethrflex. Copy free upon request.

"Fasten It Faster with Simmons Fasteners" is the title of a 32-page illustrated catalog issued by the Simmons Fastener Corporation, providing latest data and specifications on Simmons Quick-Lock, Spring-Lock, and Lock-Nut Fasteners. Copy of the catalog is available free by writing to Mr. Harry Rose, Simmons Fastener Corp., Box 1230, Albany 1, New York.

New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.
16 ga., drag holes and handles both ends.

J. L. LUCAS & SON, INC.
Bridgeport, Conn.

"Vibra - Cushioned" Carbide - Tipped Face Mills designed expressly for the face milling of steels are described in a four-page stock tool bulletin released by the Tungsten Carbide Tool Co., 2661 Joy Rd., Detroit 6, Mich. The bulletin includes complete cutter specifications, replacement blade specifications, wedge-lock specifications, and so on. Copy is available free by requesting Bulletin No. FM-46.

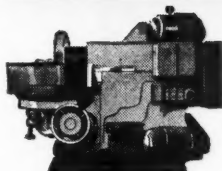
Rockford Hy-Draulic Openside Planer. Complete with illustrations and clear to-the-point description, an 18-page bulletin on the Rockford Hy-Draulic Openside Planer is now being offered by the Rockford Machine Tool Co., Rockford, Ill. Facts about design, construction, and operation are thoroughly outlined and detailed specifications of the machine are given for all of the four rated sizes, each available with a choice of five different stroke lengths from 10 to 20 feet. Copy of Bulletin 270 free upon request.

"Tool-Flex" Flexible Toolholders. A four-page folder providing illustrated, descriptive, and complete tabular information, including prices, on its "Tool-Flex" Models "B", "C", "D", and "E" Flexible Toolholders for use in performing reaming, tapping, honing, counter-boring, and other operations is now being offered by the Burg Tool Manufacturing Co., 6709 S. San Pedro St., Los Angeles 3, Calif. The models covered comprise straight shank-straight collet, taper shank-taper collet, straight shank-taper collet, and taper shank-straight collet types. Copy of folder free upon request.

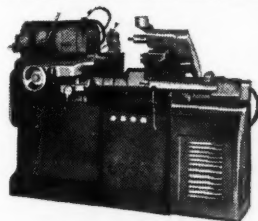
Lafayette Metal Cutting Tools. The Lafayette Tool & Supply Co., 128 Lafayette St., New York 13, N. Y., now has available a 218-page catalog presenting illustrated, descriptive, and complete tabular information regarding angle irons, arbors, bits, boring bars, calipers, centers, chucks, clamps, counterbores, cutters, demagnetizers, diamond tools, dies, drills, end mills, files, etchers, gage blocks, gages, grinders, indicators, micrometers, mandrels, parallels, plates, presses, punches, reamers, saws, rules, shears, sleeves, tables, taps, toolholders, turrets, V-blocks, vises, welders, and numerous other tools and equipment. Copy of Catalog No. 46 free upon request.

15,996 GRINDERS

External Cylindrical, Plain, 1730 of these machines with swings from under 6" to 20" are warehoused in the Boston, Chicago, Cleveland, Detroit, Philadelphia, St. Louis and New York areas.



M. Horizontal Spindle Surface Grinder. Here is a modern rotary table type machine which can be obtained in Chicago, Cleveland, Detroit and St. Louis in sizes ranging from 12" to 30" table diameters.



H. Internal Cylindrical, Hydraulic Feed. These modern production machines are available in quantity in Cleveland and Detroit and in smaller amounts in other W.A.A. offices. These are precision tools with many applications to post-war production needs.

CHECK AND MAIL TODAY!

To War Assets Administration.
Without obligation, please send me detailed specifications and price data on the following checked items:

A	G	M	S	Y
B	H	N	T	Z
C	I	O	U	AA
D	J	P	V	BB
E	K	Q	W	CC
F	L	R	X	DD

Grinder check list

Key letters correspond to items shown in list at right. Simply check the key letter of the items in which you are interested.

Name.....Telephone No.....

Form.....

Address.....

City.....State.....

Zip.....

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

Take your pick of these modern, high-speed tools left over from war. Here by the hundreds are the grinders you need to complete reconversion or finish tooling up for new post-war products. These machines are ready to go to work for you at once. To secure specifications, price and shipping information, simply check the coupon below. Or, if you wish to see the equipment call your nearest W. A. A. office to help you make the necessary arrangements.

SPECIAL GRINDER BUYS!

KEY	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW
A	External Cylindrical—Plain	Up to 30" swing	1730
B	External Cylindrical—Universal	Up to 16" swing	347
C	Centerless—Internal and External	All sizes	607
D	Cam		323
E	Crank Pin		63
F	Valve		349
G	Internal Cylindrical—Mech. Feed	All sizes	320
H	Internal Cylindrical—Hydraulic Feed	Up to 48" swing	1094
I	Internal Cylindrical	Under 12" swing	158
J	Internal Cylindrical—Auto Sic. Comb. Hole & Face	16" swing and over	133
K	Internal Cylindrical—Auto Sic. Planetary Type	Under 16" Diam.	39
L	Internal Cylindrical—Auto Sic. Centerless	Up to 38" Diam.	146
M	Surface—Metric Spindle		
N	Surface—Table	All size table diam.	274
O	Surface—Vertical Single Spindle	12" to 48" Table diam.	137
P	Surface—Reciprocating Horiz. Spindle—Hand Feed	12" length work cap. and over	146
Q	Surface—Reciprocating Horiz. Spindle—Power Feed	Under 18" to 130" length work cap.	840
R	Thread—External only	All sizes	628
S	Thread—External & Internal	8" Cap. and over	88
T	Tool & Cutters	All sizes	499
U	Drill	All sizes	340
V	Single Point Tool	All sizes	428
W	Bench—Double End	All sizes	2674
X	Bench—Single End	Up to 8" Wheel Diam.	1108
Y	Floor—Double End—Dry	Up to 24" Wheel Diam.	837
Z	Floor Comb.—Wet & Dry	10" to 16" Wheel Diam.	316
AA	Snag—Swing Frame		135
BB	Cam. Grinder & Buffer		1905
CC	Race Radius—External		110
DD	Race Radius—Internal		73
	Contour Profile		73

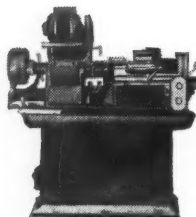
All items shown on these pages are offered subject to prior sale. This surplus property has previously been advertised and offered to prior claimants including Veterans of World War II.

EXPEDITING COUPON Free Information, Check and Mail Today

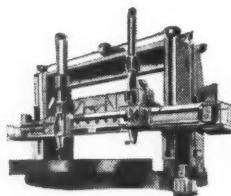
To War Assets Administration*: Please send me specifications, prices and other pertinent information on the items listed below.
(To save writing simply use the key numbers shown in the left hand column of the list at right.)

Name Telephone No.
Firm
Address State
City
*For W.A.A. addresses see 4th page of this advertisement

GET



25. Automatic Screw Machine-Bar. This single spindle, indexing turret tool is typical of the 1975 such tools available now in Detroit, Cleveland, Nashville, and Philadelphia.

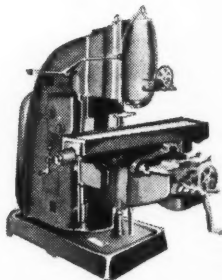


32. Vertical Boring and Turning Mill. These huge, heavy duty machines may be obtained in sizes from 36" to 120". They are available in all sizes in Detroit and in most sizes in several other W. A. A. offices such as Chicago, Cleveland and Philadelphia.

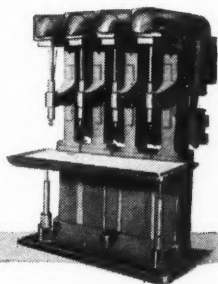
6. and 7. Box Column, Single Spindle Drill. 474 machines of this type with capacity up to 1" and swings up to 24" are in warehouses in Cleveland, Chicago, Detroit, New York, Philadelphia and St. Louis.



29. Vertical Universal Miller. In Boston, Chicago, Cleveland, Detroit and New York areas there are 847 of these machines in all sizes and types ready for immediate application.



15. Sensitive Floor & Pedestal Drills — Box Column. There are 3142 of these drills 1/2" capacity and over, 12" swing and over, located in Detroit, Boston, San Antonio, Denver, St. Louis, Spokane, Cleveland, Chicago and New York.



Veterans of World War II—To help you in purchasing surplus property, Veterans' units have been established in each War Assets Administration Regional Office.

THEM NOW!

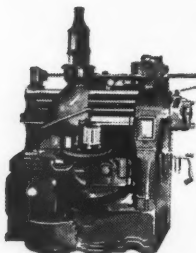
GOVERNMENT - OWNED SURPLUS MACHINE TOOLS

No need to wait for modern production equipment! The tools that won the war can win extra profits for you... and do it now! Just look at the hundreds of machine tools shown in this advertisement—all ready for immediate shipment anywhere. For detailed specifications, prices, shipping procedures and location of the equipment simply fill in and mail the coupon at left to your nearest W. A. A. office. Or, if you prefer, call and make arrangements to visit the plants and warehouses where the equipment in which you are interested is stored.

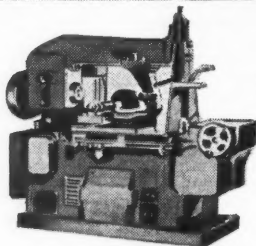
CHECK LIST OF SPECIAL MACHINE TOOL BUYS!

Here are a few of the many hundreds of machine tools available through War Assets Administration.

KEY	MACHINE	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW	KEY	MACHINE	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW	
1	Soring, Drilling & Milling	Horizontal	Under 3" to 6"	309	27	Miller	Horiz.—Plane—Hand Feed	10" and Over Table Travel	364	
2	Boring & Turning Mills	Vertical	Under 36" to 130" Swing	653	28		Horiz.—Plane—Knee Type	All sizes	2125	
3	Boring & Turning Fixed Rail Mills	Vertical		87	29		Vertical—Universal Automatic	All sizes	847	
4	Precision Boring Machines	Horiz. bridge—single end	Under 8" to 14"	456	30		Bed Type—Plane—Horiz. Spindle	All sizes	458	
5		Horiz. bridge—double end	Under 8" to 14"	226	31		Vertical Spindle—Std.	All sizes	3703	
6	Drills	Box column—single spindle	Under 15" Cap. } Up to 22" Swing } 1/4" to 1" Cap. } 16" to 24" Swing }	357 187 738 1163	32		Vertical Fixed Bed Preformer (1 & 2 Spindle)	All sizes	428	
7					33		Thread—Universal—Not Automatic	12" and over Work Diam.	847	
8					34		Thread—Universal—Auto.	Up to 30" Cap.	76	
9					35		Thread—Auto.—Chucking		238	
10					36		Planetary	6" to Over 10" Work Diam.	307	
11					37		Spindle	Work Diam.	206	
12					38		Engravers		248	
13					39		Penograph—3 Dimensions		70	
14					40		Hones	Under 6" Bore	175	
15					41		Lepping		129	
16					42		Polishers & Buffers	Flat surface only	34" Diam. Lap Plate	107
17					43		Lathes	Flange Type	1/2 to 10 H.P.	1479
18					44		Saws	Spind Type	Up to 3 H.P.	1490
19					45		Lathe	Circular Cut-Off		230
20					46		Lathe	Cut-Off	Under 1" Bore	136
21					47		Lathe	Ball Drum & Disc		380
22					48		Lathe	Vertical—1 & 2 Spindle		112
23					49		Lathe	Horizontal—1 Spindle		457
24					50		Lathe	Ball Rotary—1 Spindle		259
25					51		Lathe	Double End—Horizontal		112
26					52		Lathe			141
					53		Lathe			104
					54		Lathe			216
					55		Lathe			31
					56		Lathe			149
					57		Lathe			168
					58		Lathe			111
					59		Lathe			1631
					60		Lathe			300
					61		Lathe			455
					62		Lathe			93
					63		Lathe			67



C. Gear Shaper, External and Internal. Two hundred and eighty of these modern machines are available for immediate delivery in Boston, Chicago, Detroit and New York. Sizes above 75" are to be found in Detroit only.



A. Gear Hobber, Horizontal. These machines, available in Chicago, Houston, Detroit and New York, may be obtained in sizes up to 16" capacity for spur and helical gears and pinions and straight splines.

GEAR CUTTING and FINISHING TOOLS

GOVERNMENT-OWNED SURPLUS PRODUCTION EQUIPMENT

All over America urgently needed production is being held up and profits lost for lack of essential parts—many of them gears. In the W. A. A. warehouses, are 2353 highly productive gear cutting and finishing machines of standard make—ready to go to work immediately to produce needed parts. To see them you need only to contact your nearest W. A. A. Regional Office below—or watch your newspapers for special sale announcements in your locality.

SPECIAL BUYS!

KEY	MACHINE	TYPE	SIZE OR CAPACITY	QUANTITY AVAILABLE NOW
A	Gear Hobber	Horizontal	4" to 16" Cap.	321
B		Vertical—Universal	Under 16" Diam.	89
C	Gear Shapers	External & Internal	Up to 40" Diam.	280
D		Spur—External only		153
E		Spur & Helical—Ext. & Int.	Up to 28" Diam.	373
F		Spur & Helical—Ext. only		159
G		Bevel Type not incl. Planer Type St. Bevel	Up to 36" Diam.	377
H	Gear Tooth Finisher	Generating Type Grinding		140
I		Formed Wheel Type		190
J	Gear Tooth Lapper	External only		80
K		Comb. External & Internal		57
L	Gear Tooth Shaver	Rotary Type		133

FREE INFORMATION:

To War Assets Administration:

Please send me specifications and price information on the items checked below:

A
B
C
D

F
G
H

I
J
K
L

Key Check List: These Key letters correspond to the items listed in the table at the left. Simply check the key letter for the data you want.

Name.....Telephone No.....

Firm.....

Address.....

City.....State.....

275-S

WAR ASSETS ADMINISTRATION

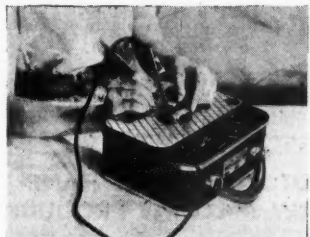
OFFICES LISTED BELOW ARE TEMPORARILY IN
RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta - Birmingham - Boston - Charlotte - Chicago - Cleveland - Dallas - Denver - Detroit - Helena - Houston - Jacksonville - Kansas City, Mo. - Little Rock - Los Angeles - Louisville - Minneapolis - Nashville - New Orleans - New York - Oklahoma City - Omaha - Philadelphia - Portland, Ore. - Richmond - St. Louis - Salt Lake City - San Antonio - San Francisco - Seattle - Spokane - Cincinnati - Fort Worth (Telephone 3-3381)

TOOLS for PRECISION PRODUCTION

The Modern Way to Mark Tools and Parts!

● ELECTRIC ETCHERS

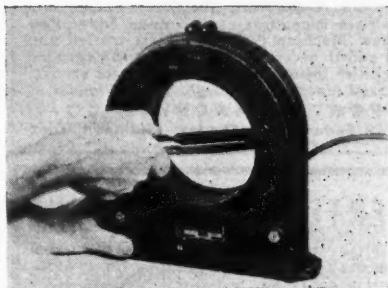


Write on steel with electricity. This is a quality tool noted for its smooth etching action. Will stand up under rough shop use. Weighs only 22 lbs. Overall case dimensions—4¼" x 8" x 10". Standard 6-ft. cord and plug for operations from 110-volt 60-cycle A.C. current. Complete with new, patented offset stylus.

Clinging Particles Mean Dull Equipment!

● DEMAGNETIZERS

With this 6" "Through Type" Demagnetizer, merely pass the work or tool through the opening and remove to a distance of one or two feet before turning off the current. To speed up production, work may be dropped through by gravity. Operates from regular power lines. No moving parts. Other standard sizes from 4" x 24" to 18" x 24".



PROMPT DELIVERY. Write for Literature.

P
PRECISION
PRODUCTION
TOOLS

ACME TOOL COMPANY

96 WARREN STREET

NEW YORK 7, N. Y.

SERVICES DIRECTORY

**GRINDING • STAMPINGS • TOOL and DIE WORK
MACHINE WORK • CASTINGS • HEAT-TREATING
FORGINGS • EMPLOYMENT • BUSINESS • ETC.**

PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

HARTFORD SPECIAL MACHINERY COMPANY

300 HOMESTEAD AVE.
Hartford, Conn.

PATTERNS

Wood and Metal — also Match Plates.
For all kinds of castings—large or small.
Estimates on Request.

GENERAL PATTERN WORKS

2231 Buck St., North of Harrison Ave.
Phone MAin 4751 Cincinnati, Ohio

AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 2" diameter — any material —
small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO.

3517 Cordiff Ave., Oakley, Cincinnati, Ohio

CENTERLESS GRINDING

*Straight, Cylindrical, Shoulder, Profile, and
Multiple Diameters . . . Ground Taper Pins
Screw Machine Products. Heat treated and
ground if necessary. Improved and expanded
facilities insure prompt and accurate service.*

Send blueprints or samples for estimates.

PORTER MACHINE CO.

3139 Enyart Ave., Oakley, Cincinnati, Ohio

CENTERLESS GRINDING

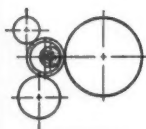
SINCE 1925

CINCINNATI

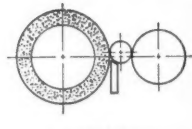
ICE PICK & TONG MFG. CO.

118 BURROWS ST. • CINCINNATI, O.

CENTERLESS GRINDING



INTERNAL



EXTERNAL

Send blueprint or sketch for quotations

FOULK MANUFACTURING CO.

4208 AIRPORT RD. • CINCINNATI 26, OHIO

GRIND THE

Eastern Centerless Way

Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

BAKELITE SILENT GEAR SERVICE

ALL SIZE BLANKS IN STOCK.
Teeth Cut To Your Specifications.
Prompt Delivery. Write for quotation.

GREAVES MACHINE TOOL COMPANY

2009 Eastern Avenue

Cincinnati, Ohio

MACHINED PARTS COMPLETE

Whole assemblies or sub assemblies.
Screw machine products up to 1 1/4".
Mail prints for estimates.

Ace Tool & Die Works

129 E. McMicken Ave., Cincinnati 10, Ohio

Modern Facilities Available

Turret Lathes—Milling Machines—Drill
Presses for large or small production runs.

PRECISION PRODUCTION PARTS

Special machines, tools and dies designed
and engineered to meet your require-
ments. Some available time for compres-
sion plastic molding. Send blueprint or
sample for prompt quotation.


MAC-ERIE

MANUFACTURING CO. • ERIE, PA.

Tool & Cutter Grinding

RESHARPENING OF HIGH SPEED
STEEL OR TUNGSTEN CARBIDE
MILLING CUTTERS - REAMERS
HOBS AND TAPS

BROACH GRINDING

A Complete Resharpener Service for Flat
or Circular Broaches up to 72" Length

CONTRACT MANUFACTURING

Production Milling - Turning - Drilling -
Centertype External or Internal Grinding

*Also Manufacturers of
Special Metal Cutting Tools*

JOHNSON GRINDING SERVICE

5137 Vine St.

Cincinnati, Ohio

NEW PRODUCTS WANTED

Our client, an established manu-
facturer, wants new products or
new ideas that might be developed
into new products.

Experienced in steel casting, weld-
ing and machining in any com-
bination—large sizes, great pre-
cision.

Selling industrial and manufactur-
ing markets.

Please write Dept. 28. Communica-
tions in confidence. We are fully
compensated by our client.

CHARLES H. WELLING & CO., INC.
Industrial Consultants

52 Vanderbilt Ave., New York 17, N. Y.

New Products — New Processes

"How to Cut Cast Iron" is the subject
of an illustrated circular issued by the
Technical Service Department of Na-
tional Cylinder Gas Co., 205 W. Wacker
Dr., Chicago 6, Ill., which completely ex-
plains the cutting of cast iron with the
oxyacetylene flame. Included is a discus-
sion of proper types of equipment, pre-
heating conditions, cutting positions, the
need of adequate protective clothing,
proper oxygen and acetylene pressures,
and so on. Copy of Circular N-606 free.

**Manhattan Vibration Dampener Bush-
ing**—feature of the wheels for portable
grinders now being offered by the Man-
hattan Rubber Division, Raybestos-Man-
hattan, Inc., Passaic, N. J.,—is described
in a bulletin announced by this firm. In
addition to providing a complete descrip-
tion of the V. D. B. Wheels, the bulletin
lists ten advantages which may be ob-
tained from the use of these wheels, in-
cluding the elimination of vibration,
minimum fatigue, and increased produc-
tion.

Copy of bulletin is available free by
writing to the Abrasive Wheel Depart-
ment of the above firm, requesting Bul-
letin No. 6878.

Immediate Delivery

No. 1 to 60
New High Speed
Long Length
DRILLS



No. by GAGE	LENGTH	OUR PRICE NET EACH
1 to 10	6 $\frac{1}{4}$ "	\$.90
11 to 20	5 $\frac{3}{4}$ "	.80
21 to 30	5 $\frac{3}{8}$ "	.70
31 to 40	5 $\frac{1}{4}$ "	.60
41 to 50	4 $\frac{1}{2}$ "	.50
51 to 60	3 $\frac{1}{2}$ "	.40

IF YOU BUY 24 OR MORE—10% DISCOUNT
IF YOU BUY 60 OR MORE—20% DISCOUNT
IF YOU BUY 100 OR MORE—25% DISCOUNT

VICTOR MACHINERY EXCHANGE, INC.
251 Centre Street **Phone: CAnal 6-5575**
NEW YORK 13, N. Y.

IMMEDIATE DELIVERY
HIGH SPEED STEEL, STRAIGHT SHANK

TWIST DRILLS

Extra Length



9" CUTTING FLUTES—12" LONG DRILLS

SIZE INCHES	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET	SIZE INCHES	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET
1/8"	12	9	\$ 1.50	21/64"	12	9	\$ 2.25
9/64"	12	9	1.50	11/32"	12	9	2.25
5/32"	12	9	1.50	23/64"	12	9	2.50
11/64"	12	9	1.50	3/8"	12	9	2.50
3/16"	12	9	1.50	25/64"	12	9	2.75
13/64"	12	9	1.60	13/32"	12	9	2.75
7/32"	12	9	1.60	27/64"	12	9	3.00
15/64"	12	9	1.75	7/16"	12	9	3.00
1/4"	12	9	1.75	29/64"	12	9	3.25
17/64"	12	9	1.85	15/32"	12	9	3.25
9/32"	12	9	1.85	31/64"	12	9	3.25
19/64"	12	9	2.00	1/2"	12	9	3.25
5/16"	12	9	2.00				

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9/16"	15	12	7.00	7/8"	15	12	12.00
19/32"	15	12	7.50	29/32"	15	12	12.50
5/8"	15	12	8.00	15/16"	15	12	13.00
21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
3/4"	15	12	8.50	1-1/8"	20	15	18.00
25/32"	15	12	9.50	1-3/16"	20	15	20.00
13/16"	15	12	11.00	1-1/4"	20	15	22.00

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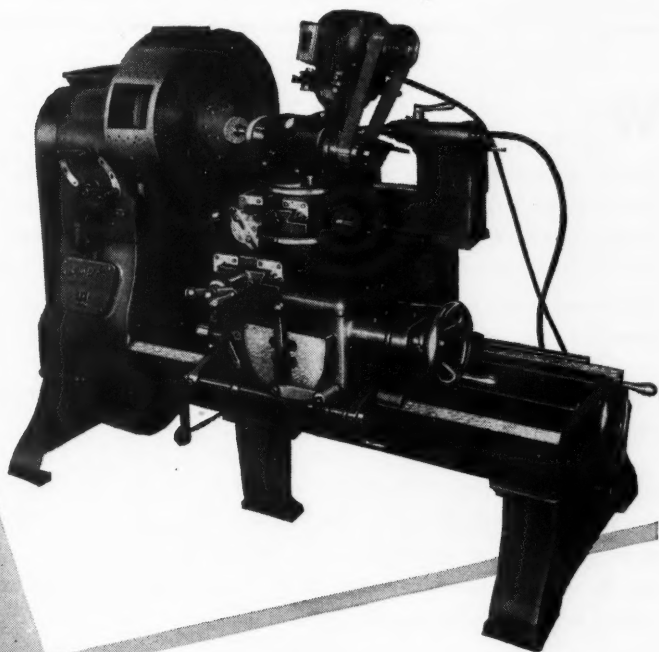
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Over the Editor's Desk

WE have been wondering how long it would be before the farmers got around to striking—and as we go to press the farmers' strike is on. Think of paying high prices for everything they buy, think of seeing those prices forced up as one union after another strikes and receives pay increases, think of seeing the prices of farm products kept down by the OPA; they are in a mood to refuse to ship food to the cities until something has been done to get them out of their predicament. No one can blame them, but misery will come quickly if farmers refuse to send food to the cities.

The farmers' strike is just about the last move in the disorganization of American society. We are dangerously near the verge of chaos.

We Americans boast about our "free" America, but we are moving at high speed toward a totalitarian form of government. The government has turned the control of industry over to the unions; if a union strikes and the employer closes his plant, the government takes over the plant, operates it, gives the union the increase it demanded, and turns the plant back to the owner with orders to pay the increase.

Thus the government determines the wages, sets the price (through OPA), and determines who shall have materials.

Unless the great unorganized majority wakes up, America will be controlled by a communistic government within the next ten years.

Is America to continue to be the "land of the free," or are the great majority of Americans going to see our government taken over by an organized minority?

What are we going to do about it?

Howard Campbell

To help increase "Take-Home Savings"

The Treasury Department has published two new booklets to help you and your employees realize the utmost benefit from your Payroll Savings Plan.

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If you have not received these two booklets, or desire additional quantities, communicate with your State Director of the Treasury Department's Savings Bond Division.



The Treasury Department acknowledges with appreciation the publication of this message by

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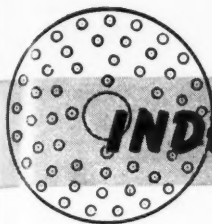
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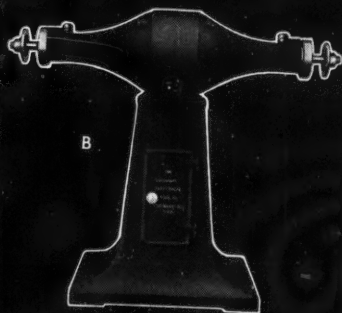
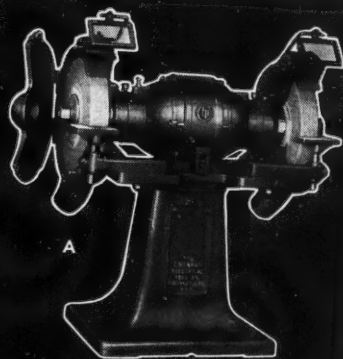
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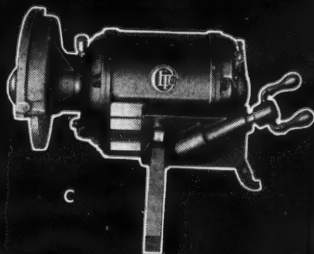
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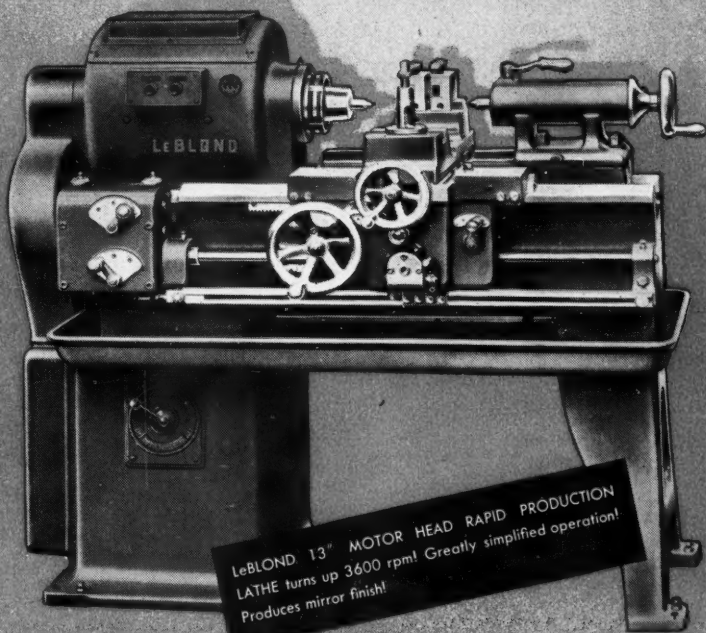
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